FOOD MANUFACTURE

Incorporating Food Industries Weekly

NARD HILL LIMITED, STRATFORD HOUSE, 9 EDEN STREET, LONDON, N.W.1 AUGUST 1, 1956

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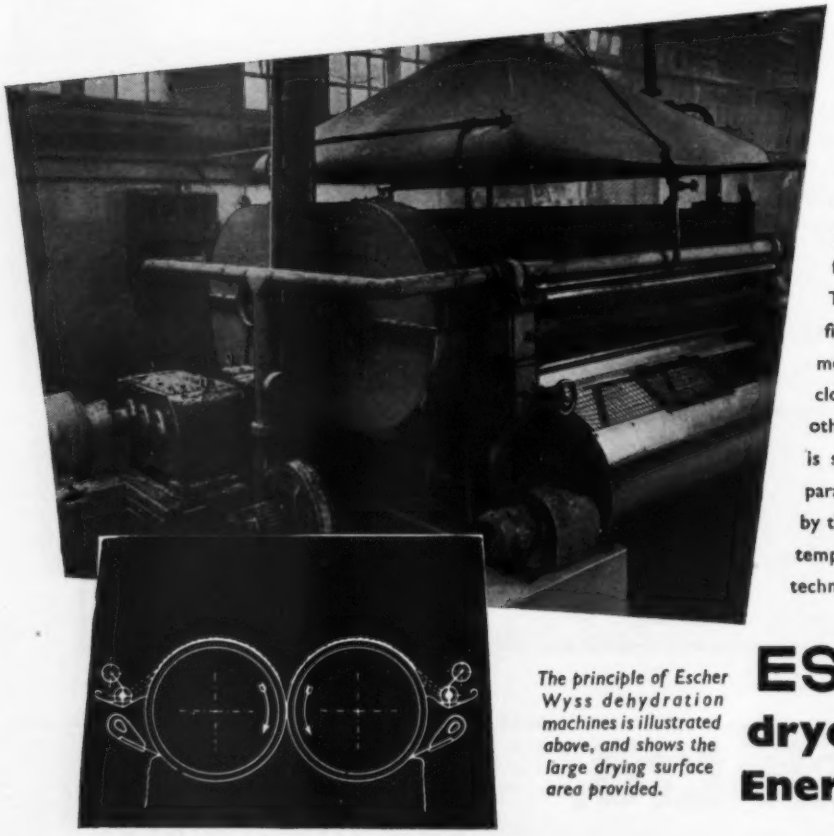

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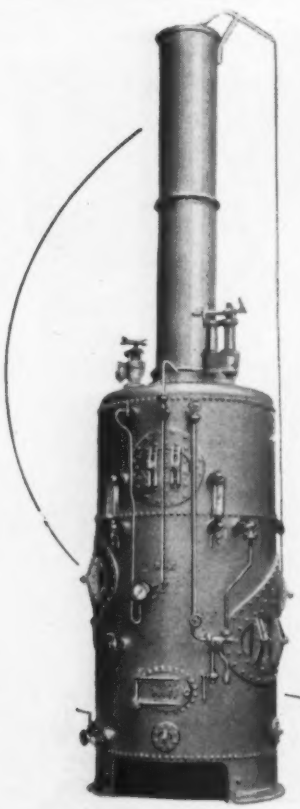

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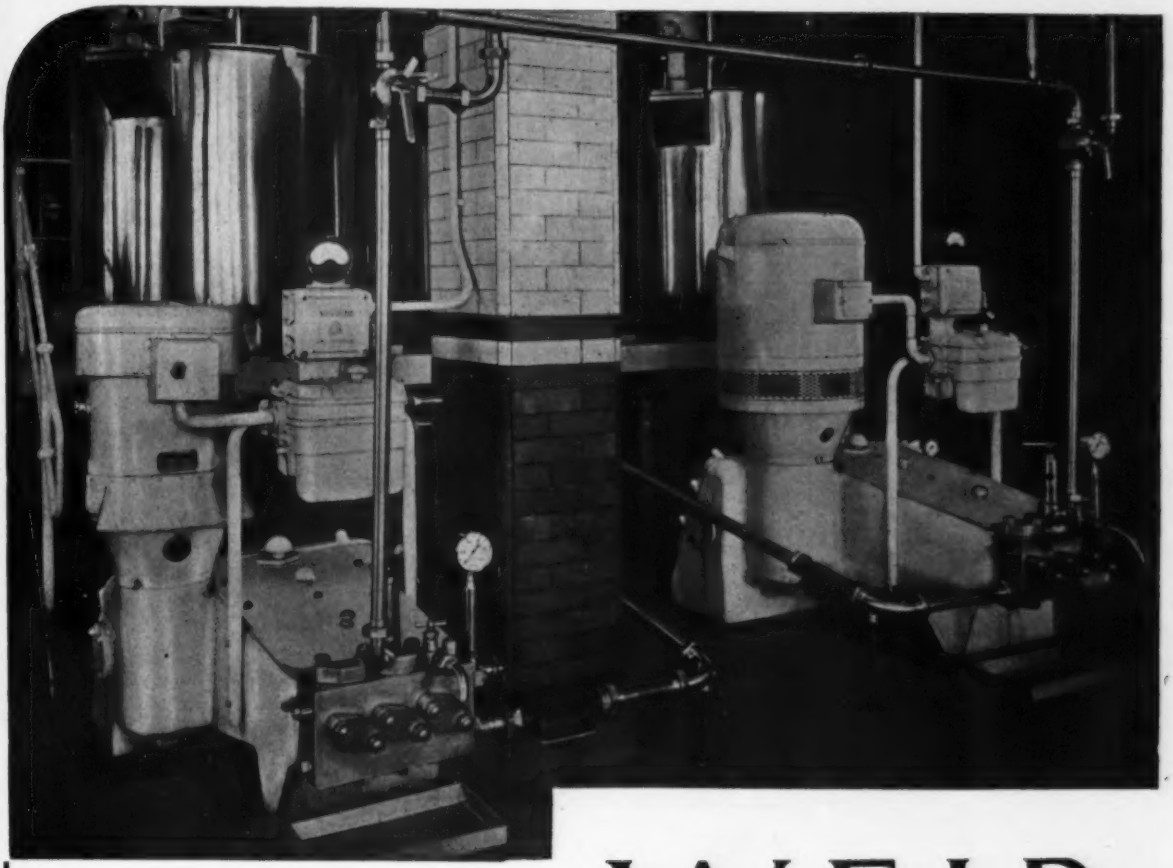

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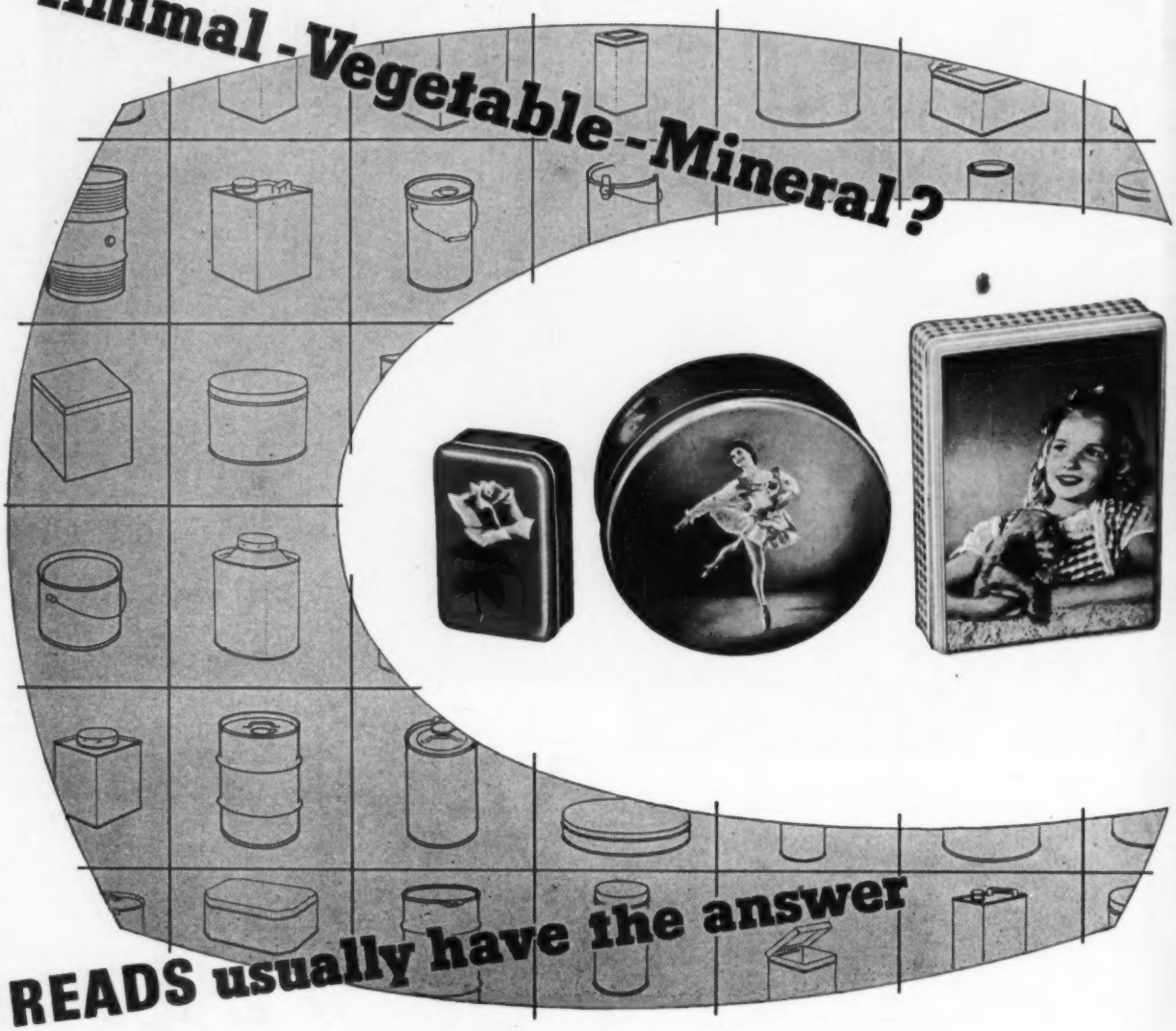

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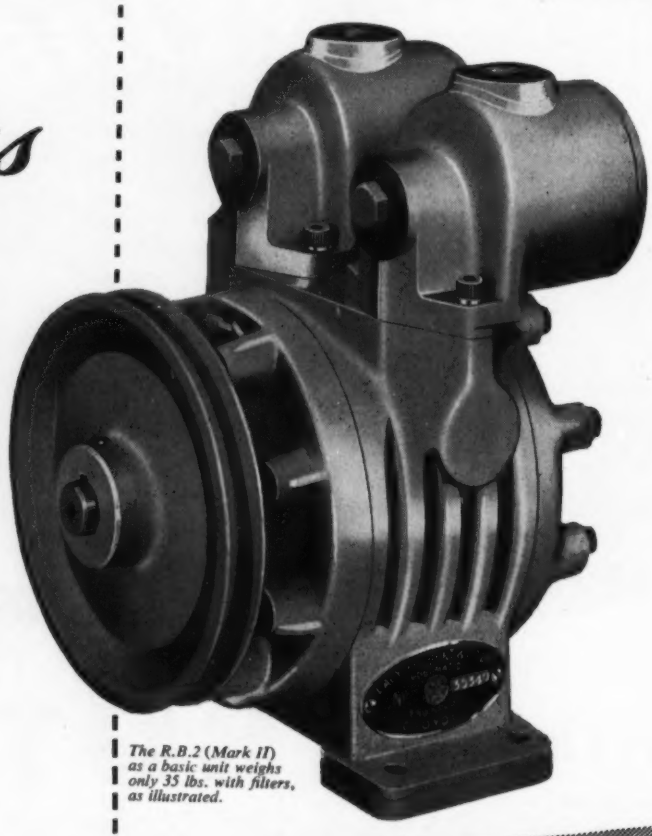

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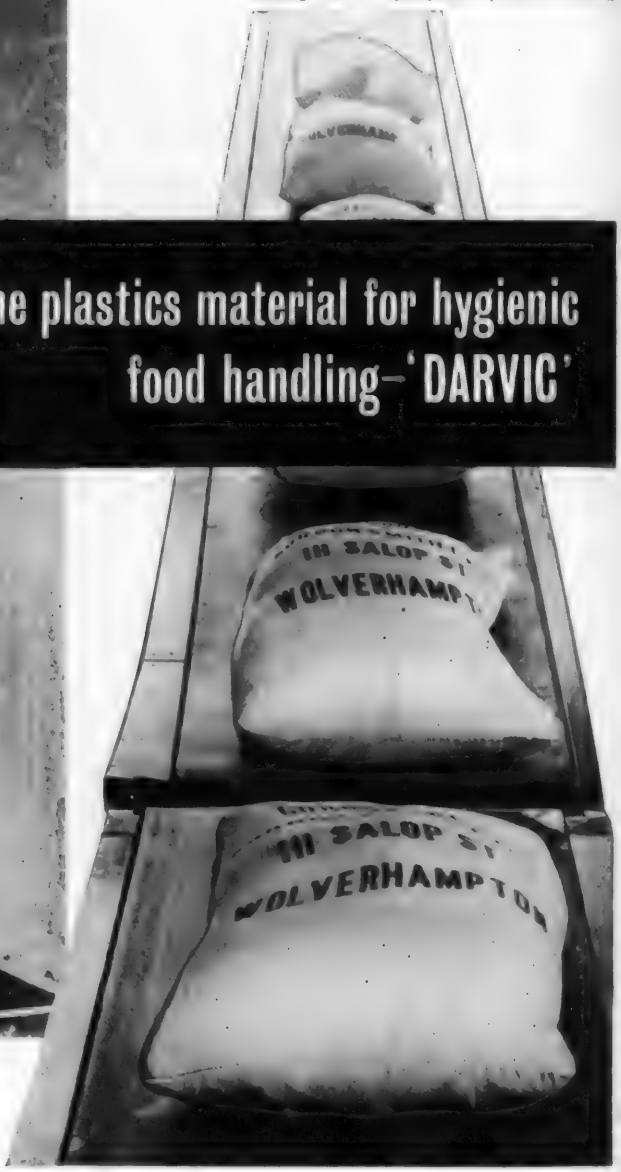

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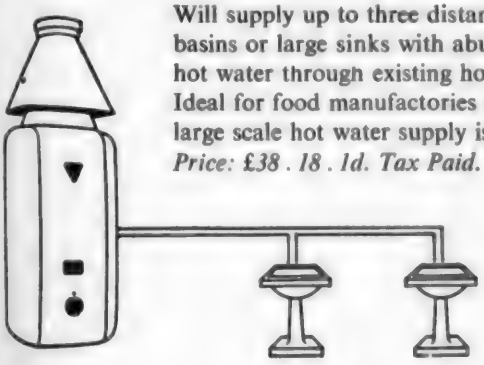
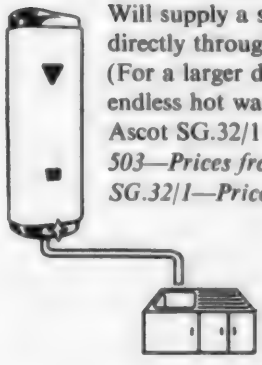
ASCOT

ASCOT 709 LARGE MULTIPOINT



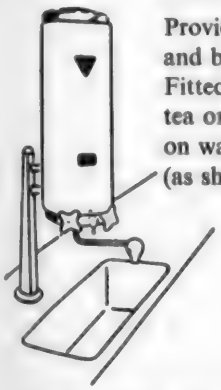
Will supply up to three distant handbasins or large sinks with abundant hot water through existing hot taps. Ideal for food manufactories where a large scale hot water supply is essential.
Price: £38 . 18 . 1d. Tax Paid.

ASCOT 503 SINK WATER HEATER



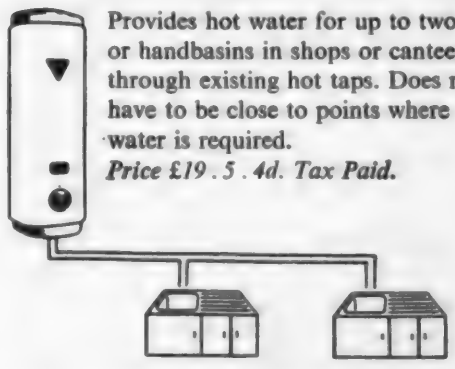
Will supply a sink or handbasin directly through a swivel spout. (For a larger direct supply of instant endless hot water to a big sink, the Ascot SG.32/1 is ideal.)
503—Prices from £14 . 17 . 3d. Tax Paid.
SG.32/1—Price: £33 . 15 . 4d. Tax Paid.

ASCOT 509 BOILING WATER HEATER



Provides warm or hot water instantly and boiling water in less than a minute. Fitted with 3-heat control. Ideal for tea or coffee making. Can be installed on walls, or on shop or bar counters (as shown) on an Ascot pillar support.
Price: £25 . 6 . 6d. Tax Paid.

ASCOT 503/4 SMALL MULTIPOINT



Provides hot water for up to two sinks or handbasins in shops or canteens through existing hot taps. Does not have to be close to points where water is required.
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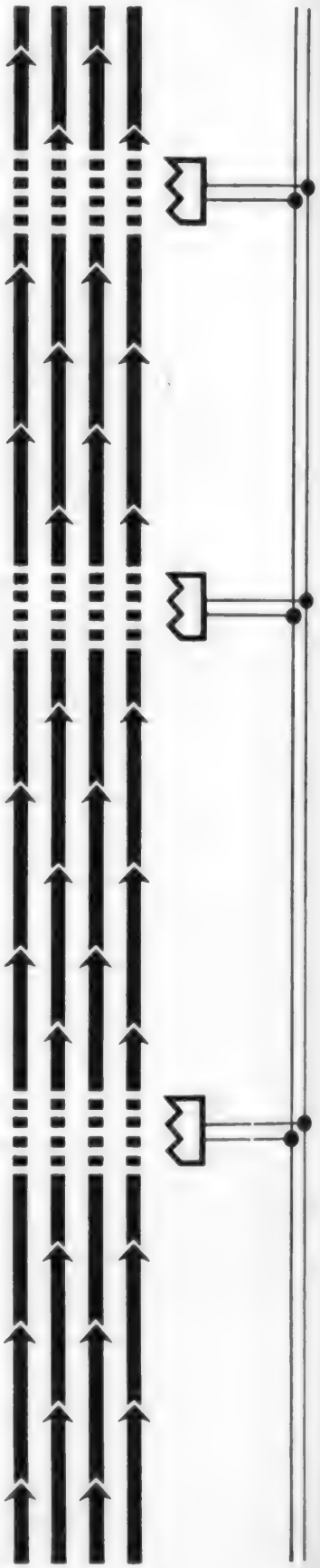

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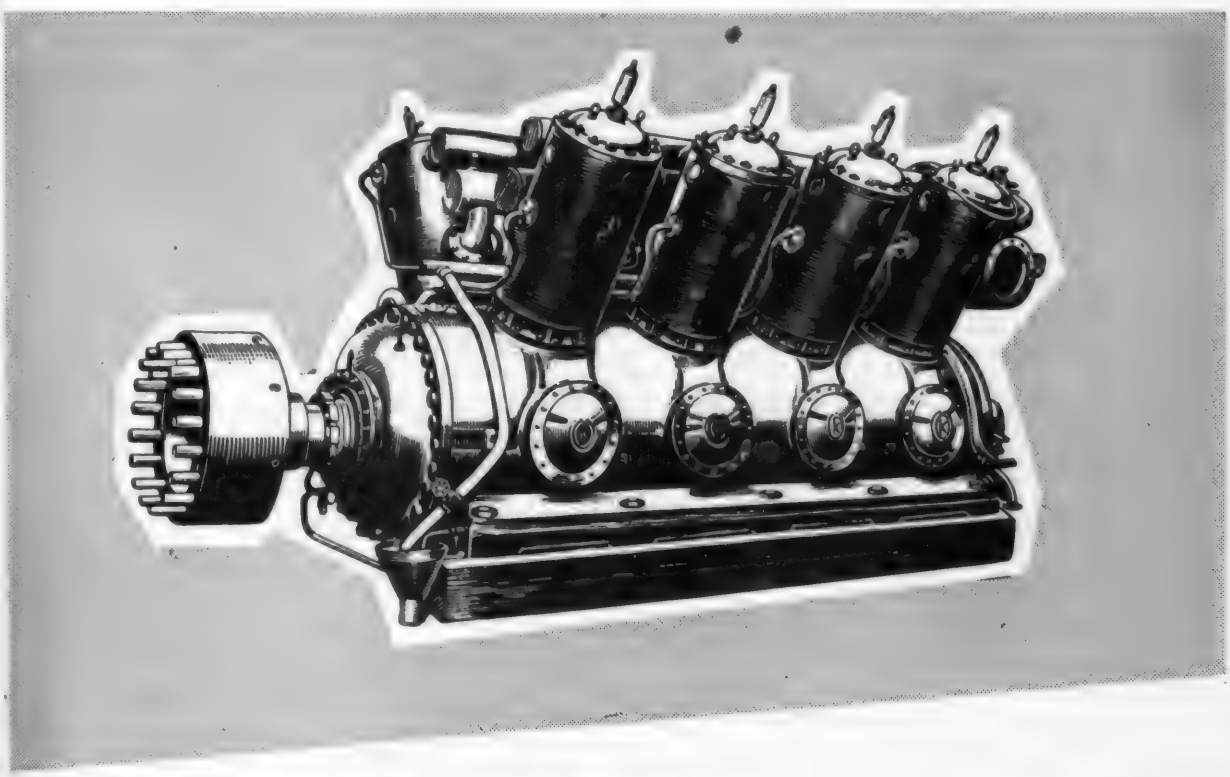

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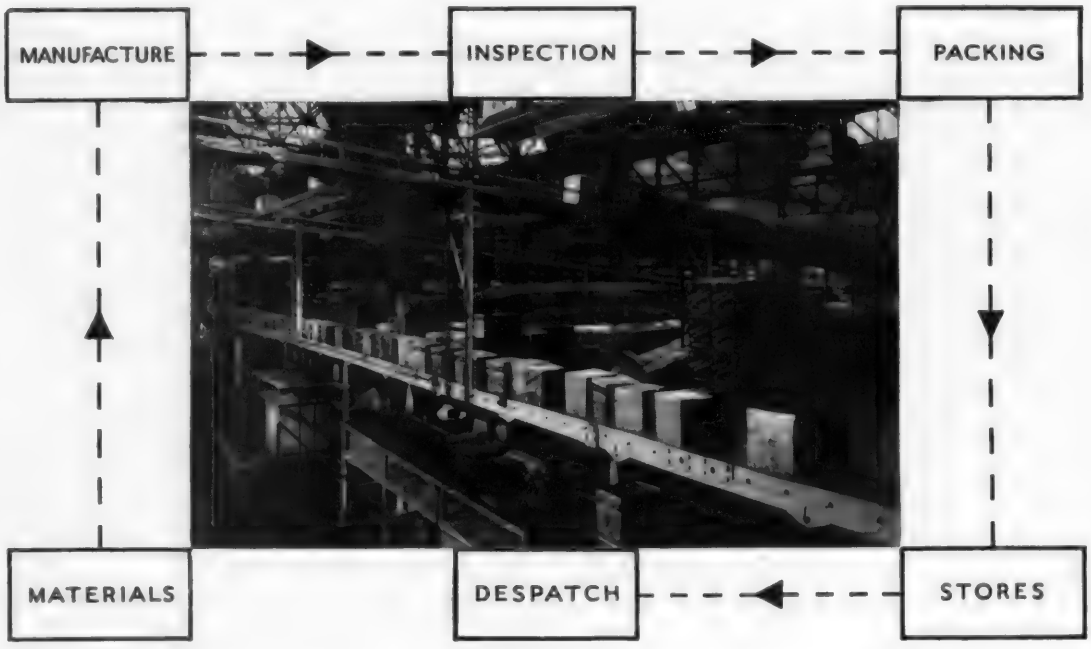

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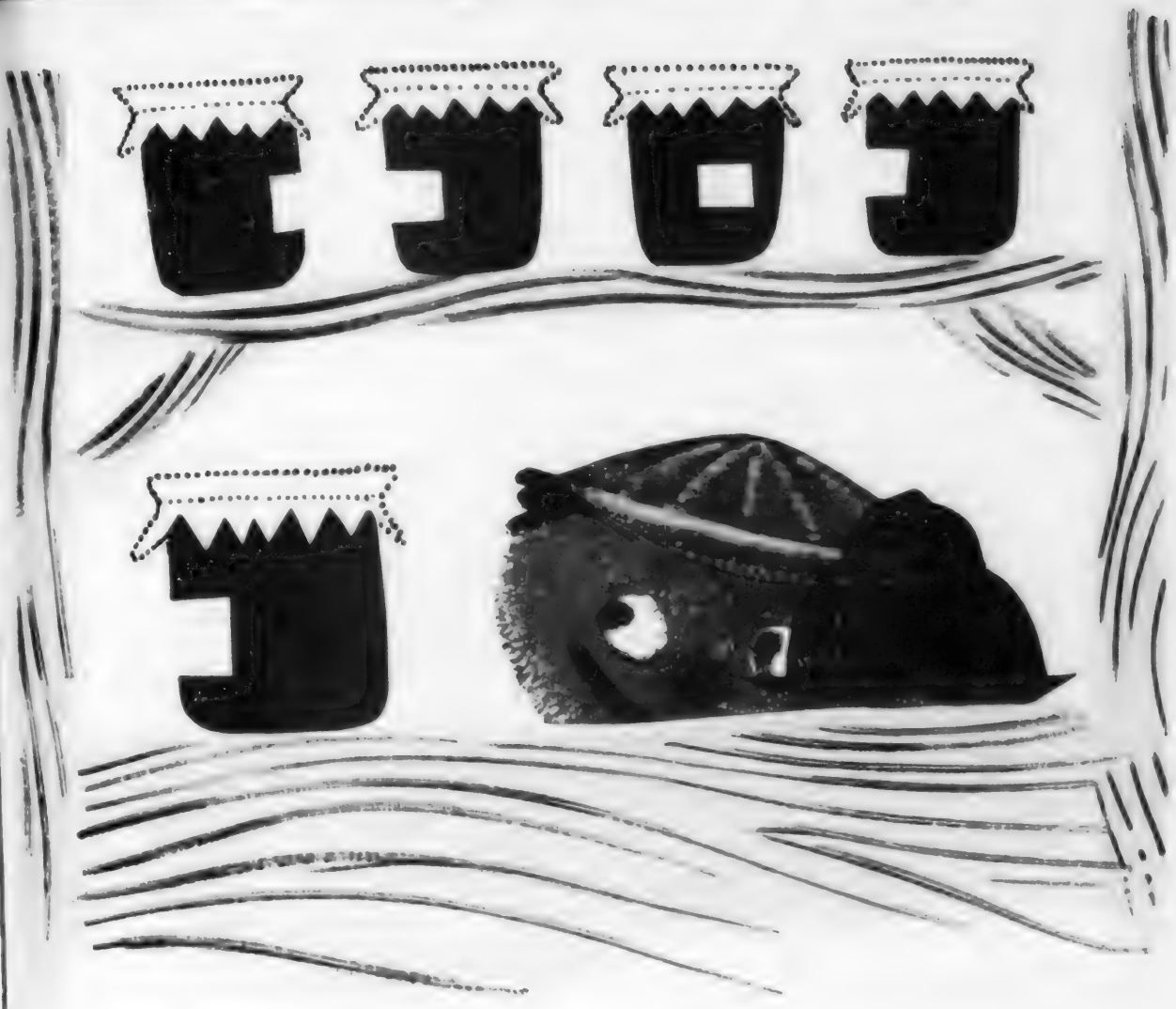

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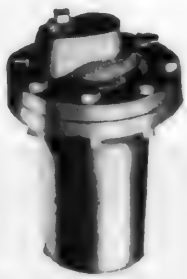

"Well, Son, we managed all right while you were away. Feeling fit?"

"Bang on, Chief. See you got over that trouble with the compressed air."

"Sure thing, Son. Got me guessing till the Drayton bloke happened along."

"What did he do, Chief?"

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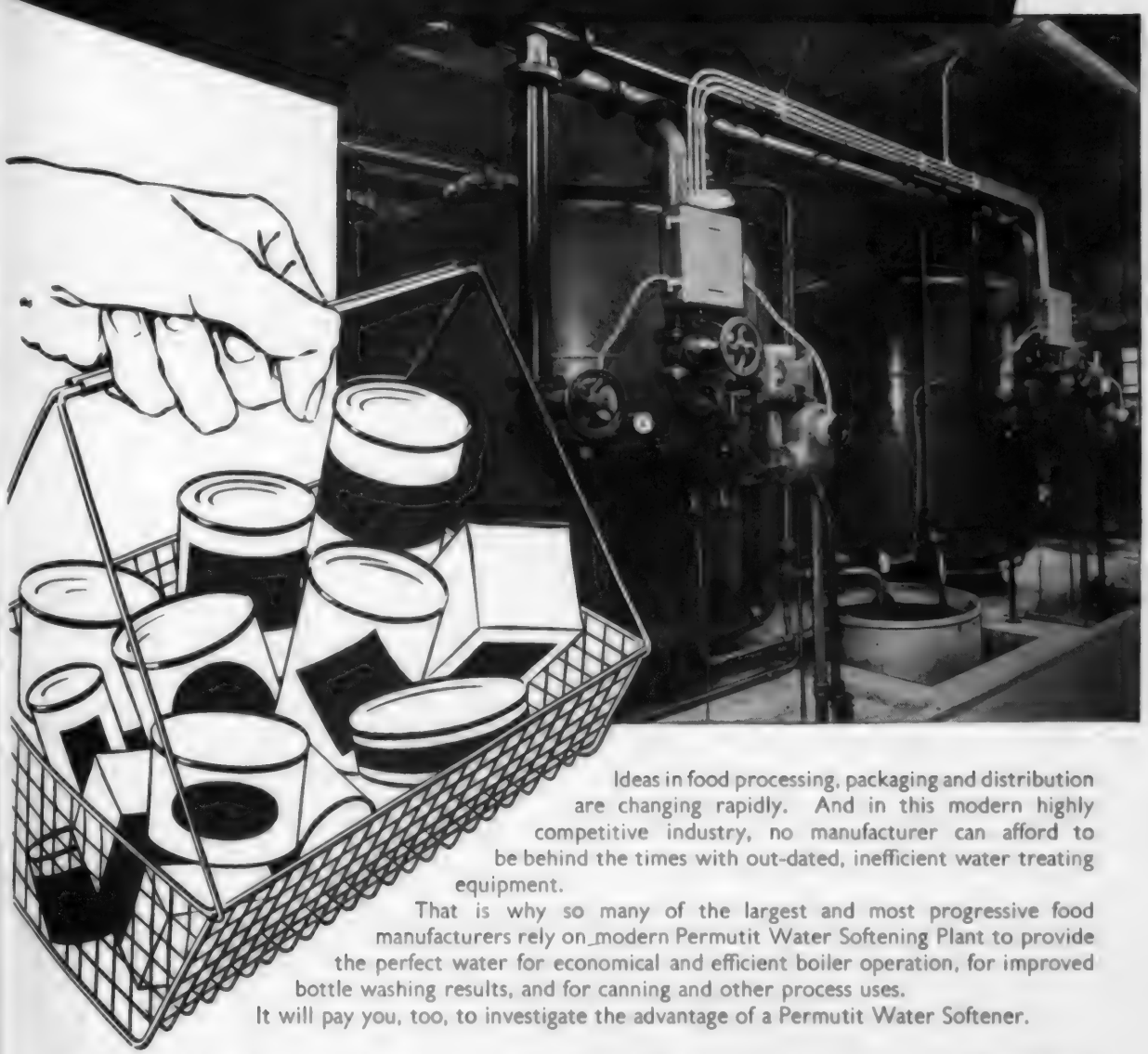

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3. **SCIENTIFIC ASSISTANCE** *from the staff of the Research and Development Division. They work to improve existing films, to develop new ones, to find answers to film-users' queries.*

4. **PACKAGE DESIGN HELP** *from artists and designers. They are specialists in creating attractive packages for all kinds of products, however awkward their shape and size.*

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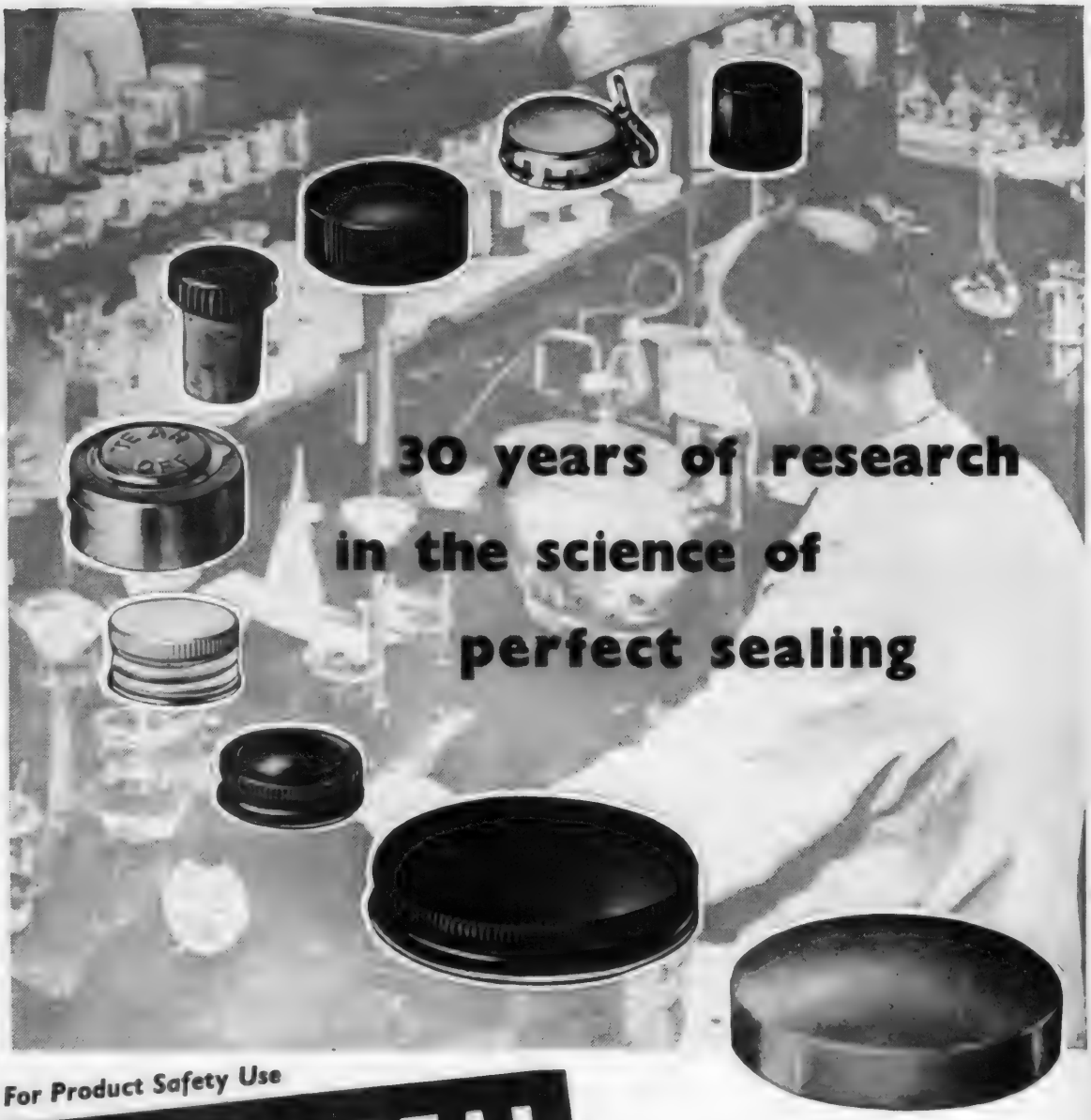

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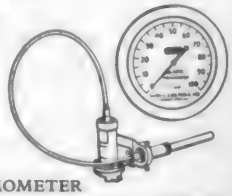

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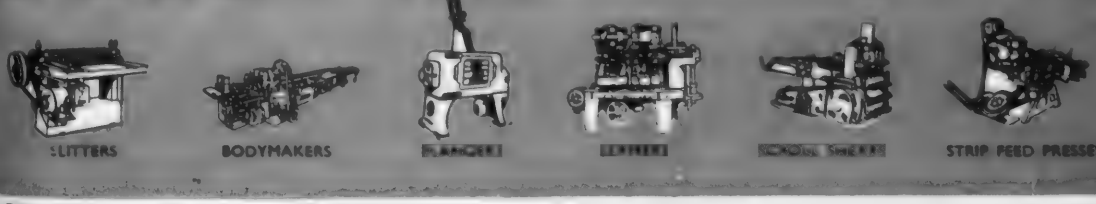

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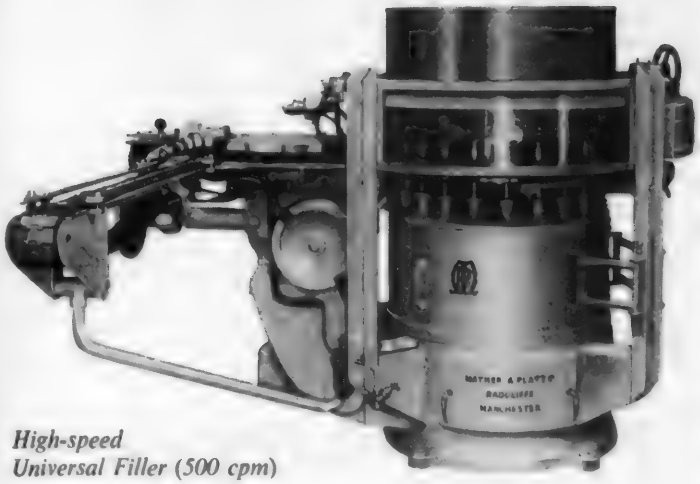

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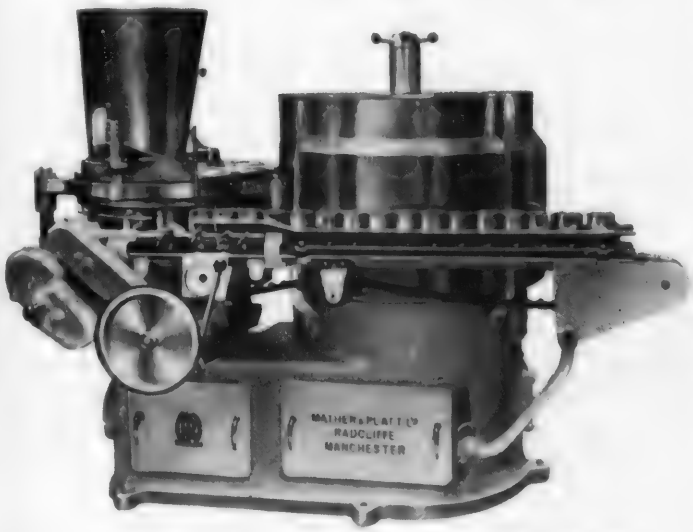

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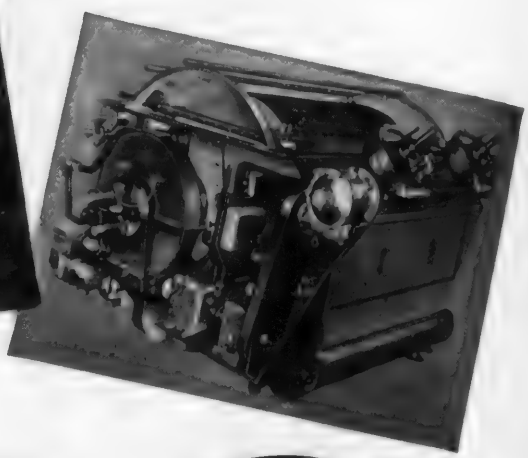

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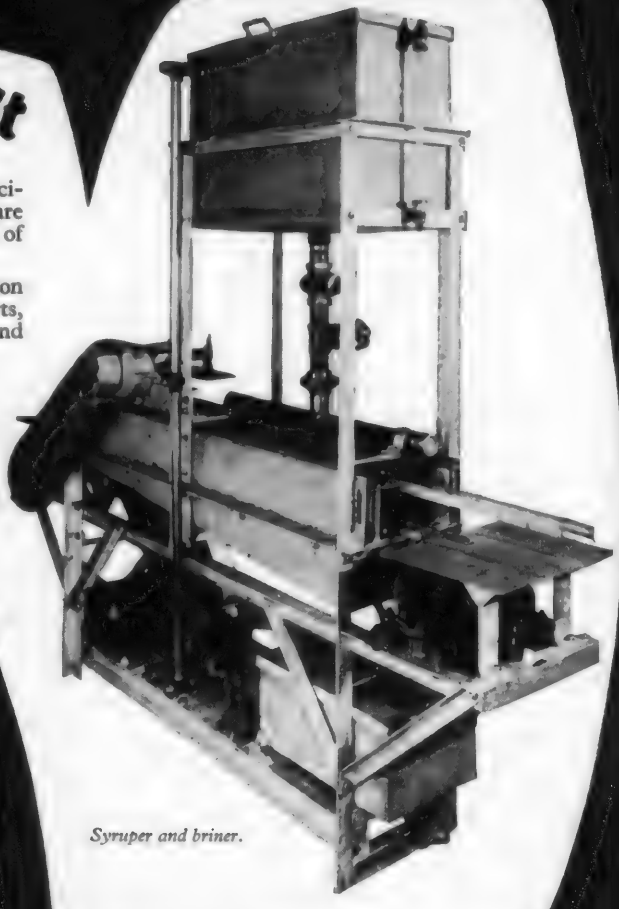
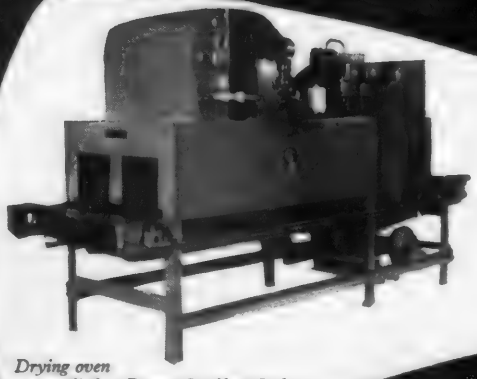


Syruper and briner.



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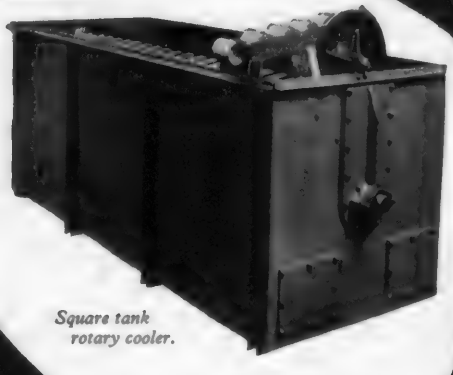

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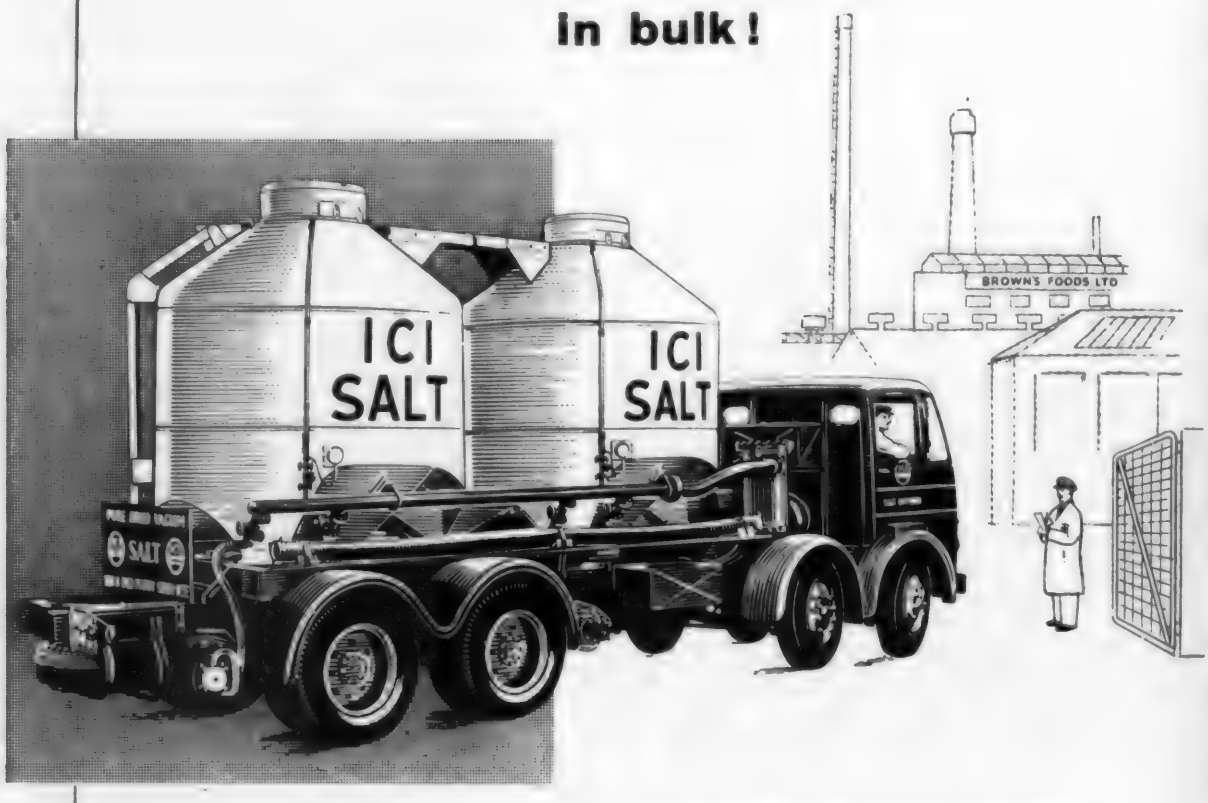

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BS.31

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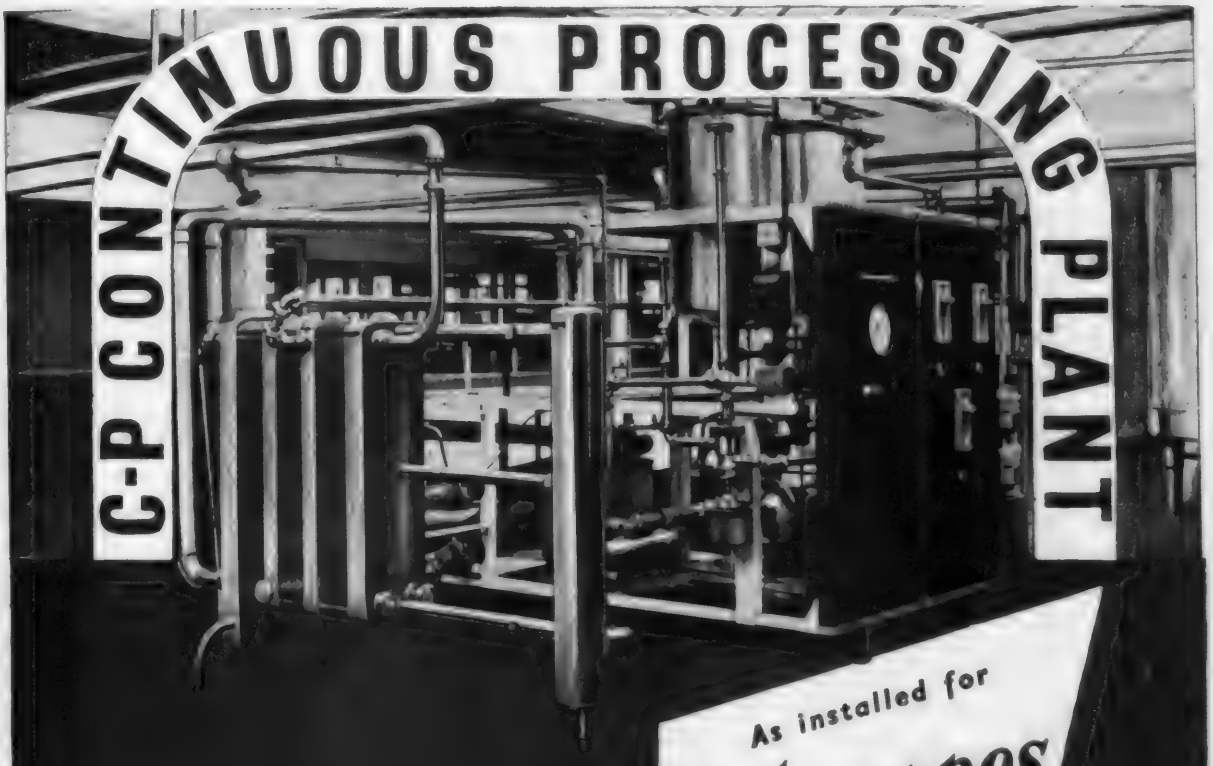

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Where your product would benefit by—Pasteurising for longer shelf life; De-aeration for protection against oxidisation; C.P. Equipment can give you

HIGHEST THROUGHPUTS
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The easily cleaned flat crevice-free Heat Exchange Plate and separate seal developed by C.P. Equipment Ltd. enable capacities to exceed 1,000 g.p.h. operating continuously for more than 16 hours per day.

MAY WE ADVISE ON YOUR PROCESSING PROBLEMS

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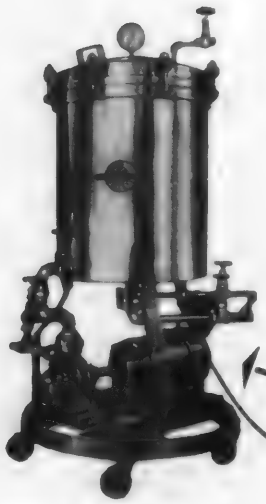
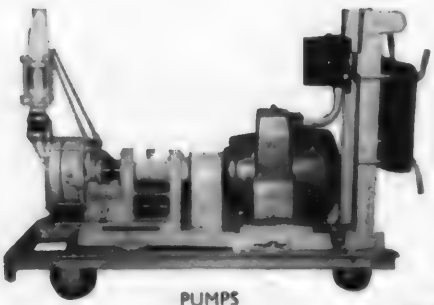
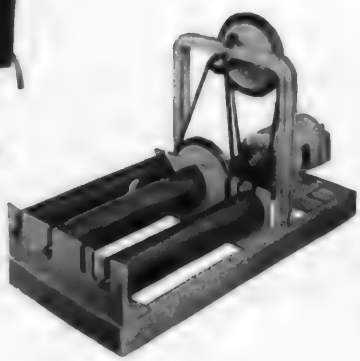


SPARKLER HORIZONTAL PLATE FILTER



PUMPS



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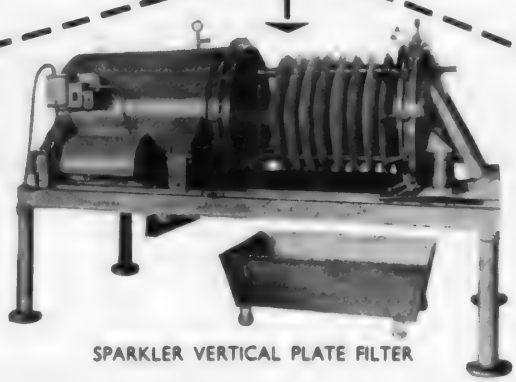

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LABORATORY MIXERS

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Special Vessels for every Industrial Process

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VULCANIZERS

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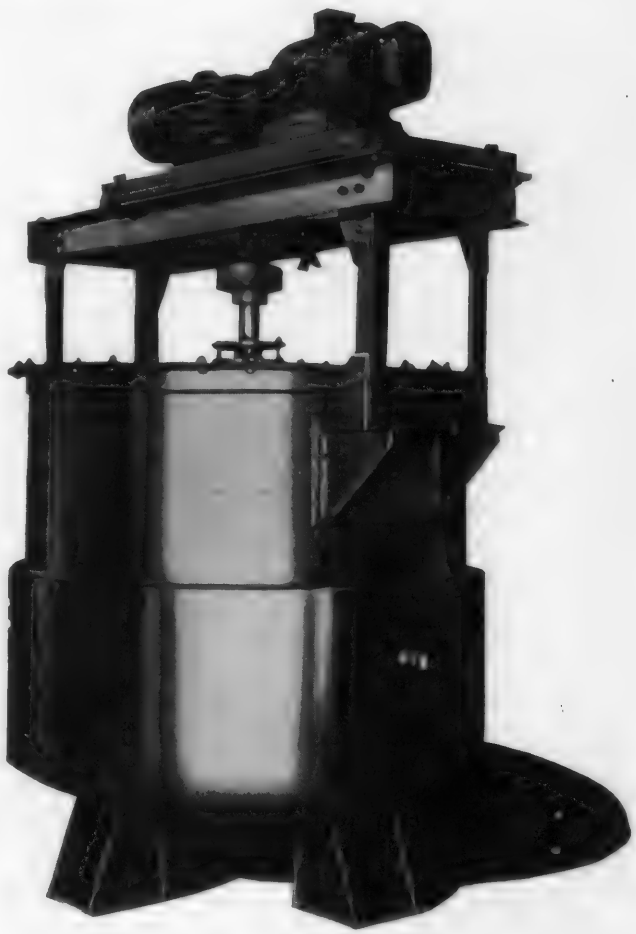

THE illustration shows a Steam Jacketed Mixing Pan 4′ 6″ diameter by 5′ 0″ deep, fitted with stirrer gear operated by electric motor and reduction gear. This type of mixing pan can be made in any size to satisfy special requirements and working conditions. Vessels of the same design are supplied with or without steam jacket, or, alternatively, fitted with internal steam coils.
Manufactured in mild steel, stainless steel or mild steel with integrally clad material of stainless steel or monel.

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OLDBURY NEAR BIRMINGHAM
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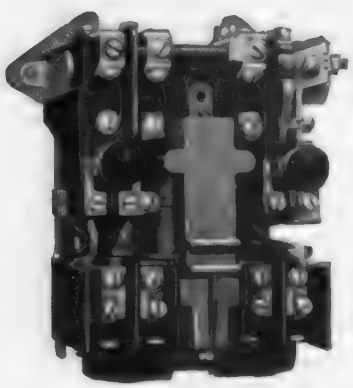
A. C. Direct-on-line CONTACTOR STARTER Type DOC71

for single-phase or polyphase non-reversing squirrel-cage induction motors.

This new starter is elegant in appearance, sturdy in construction, and dependable in operation. It is available for motors up to 5 horsepower, and complies with BS.587 for "Frequent Duty", i.e. forty starts per hour.



The starter, comprising a triple-pole contactor with normally-open auxiliary switch and triple-pole hand-reset thermal overload relay, is enclosed in a distinctive die-cast aluminium case with integral START-STOP push buttons.

Up to 5 h.p. 200-550 volts
25-60 cycles

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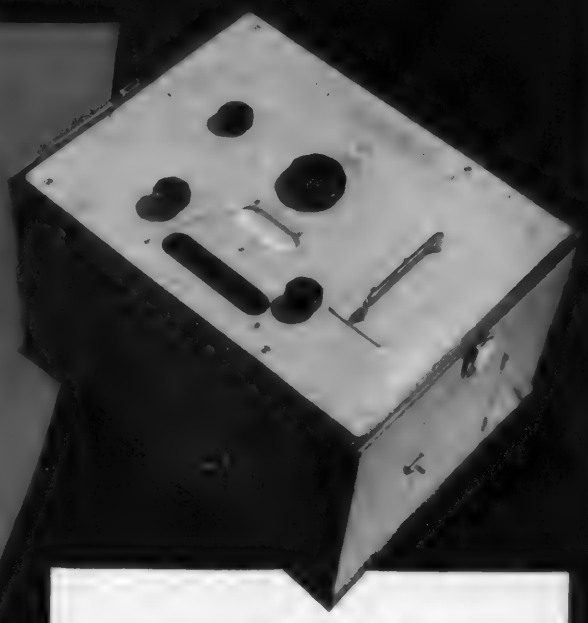
THE UNIVERSAL STANDARD FOR FLOUR COLOUR

The Series II Kent-Jones & Martin Flour Colour Grader



Producers and users of flour in all these countries use the Series II Kent-Jones & Martin Flour Colour Grader as their standard for flour colour:

U.K.	Sweden	Portuguese E. Africa
Eire	Australia	India
Northern Ireland	Israel	Pakistan
France	South Africa	Canada
Belgium	Kenya Colony	U.S.A.
Holland	Southern Rhodesia	Japan
Germany	Ecuador	Portugal
Switzerland	Greece	Finland
Denmark	Peru	Brazil
Norway	Argentine	Austria
Uruguay	Hong Kong	Mexico
	Poland	

The only reliable method of measuring flour colour and expressing it in a form suitable for recording or comparison is the Series II Kent-Jones & Martin Flour Colour Grader.

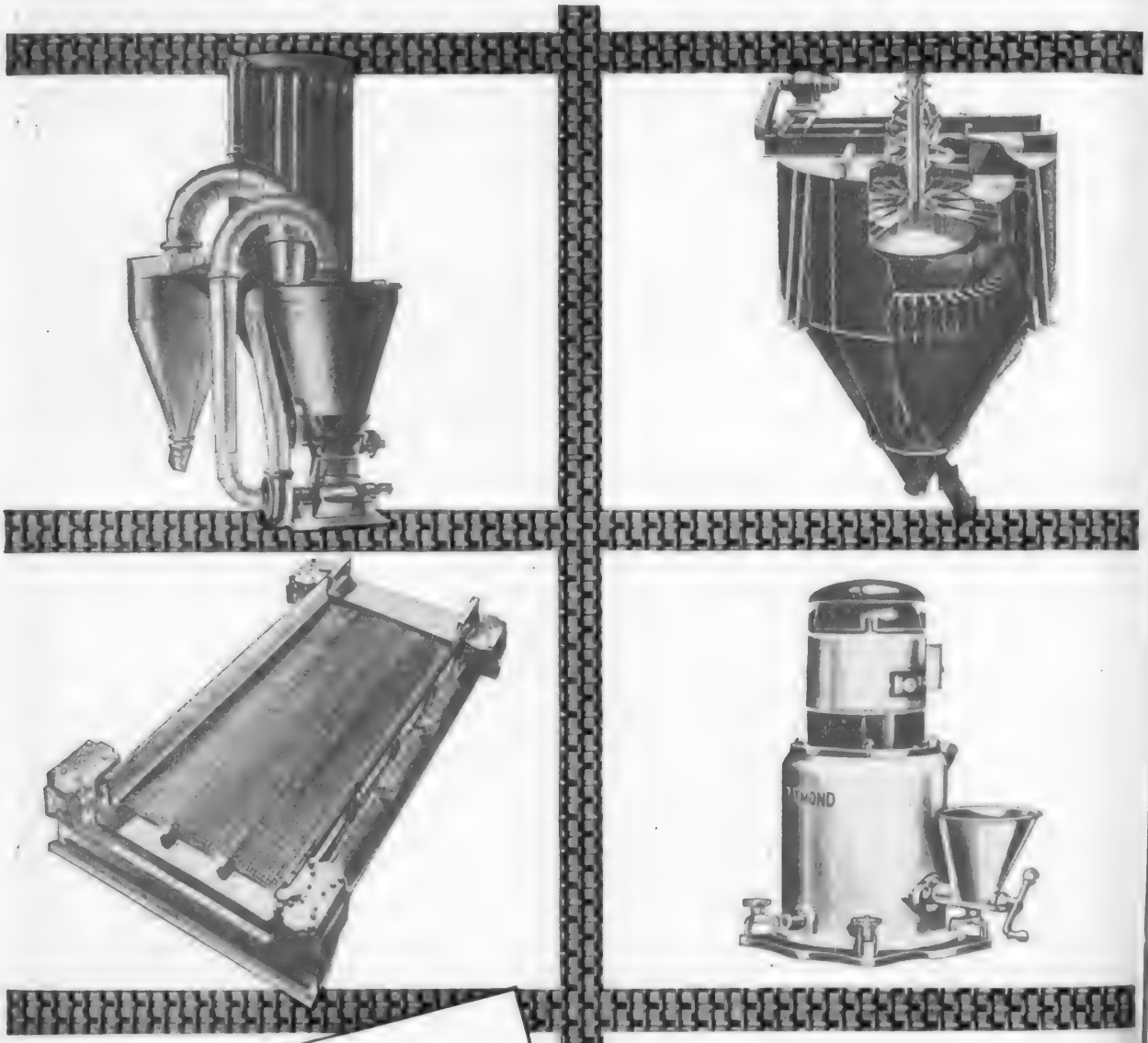
- ACCURATE CALIBRATION the optical system ensures that all instruments give equivalent results; makes lamp and cell replacement easy.
- GREAT SENSITIVITY for accuracy in reading.
- WIDE RANGE even the whitest flours can be graded.
- BUILT-IN STANDARD for a constant check on performance.
- NEAT CONSTRUCTION for ease of cleaning and attractiveness of appearance.

SIMON laboratory equipment

HENRY SIMON LIMITED · STOCKPORT · ENGLAND

H.S. 255

IC *experience** COUNTS



*IC key equipment is helping to improve production throughout the food industry

Here are four typical machines — the Raymond Pulveriser, Mechanical Separator, Hummer Screen and Laboratory Separator—from the IC range of processing plant. With any basic material . . . for any industry . . . you can depend on IC equipment.

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VITAL ROLE OF FATS

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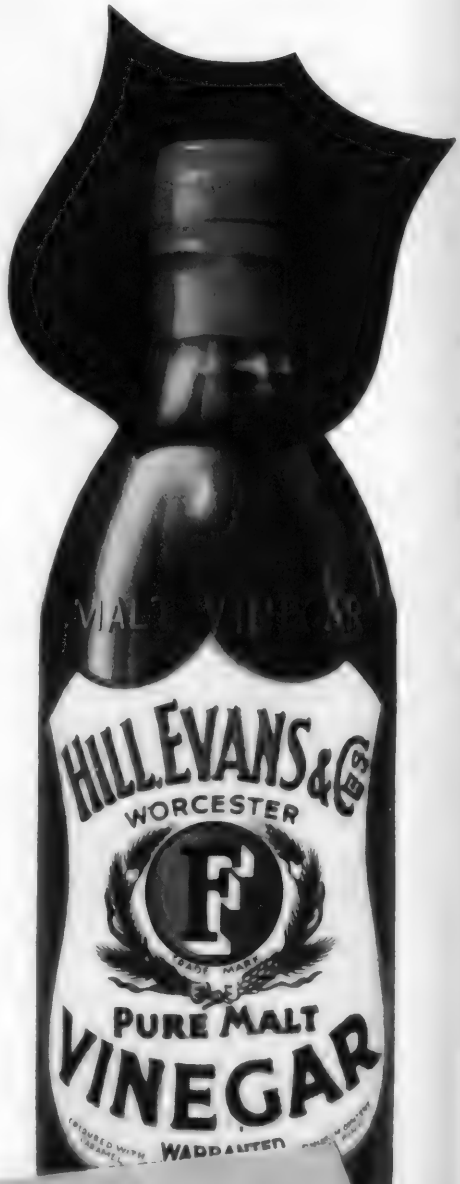
- CELLULOSE CLOSURES . . . Contain No Metal . . . Require No Adhesive.



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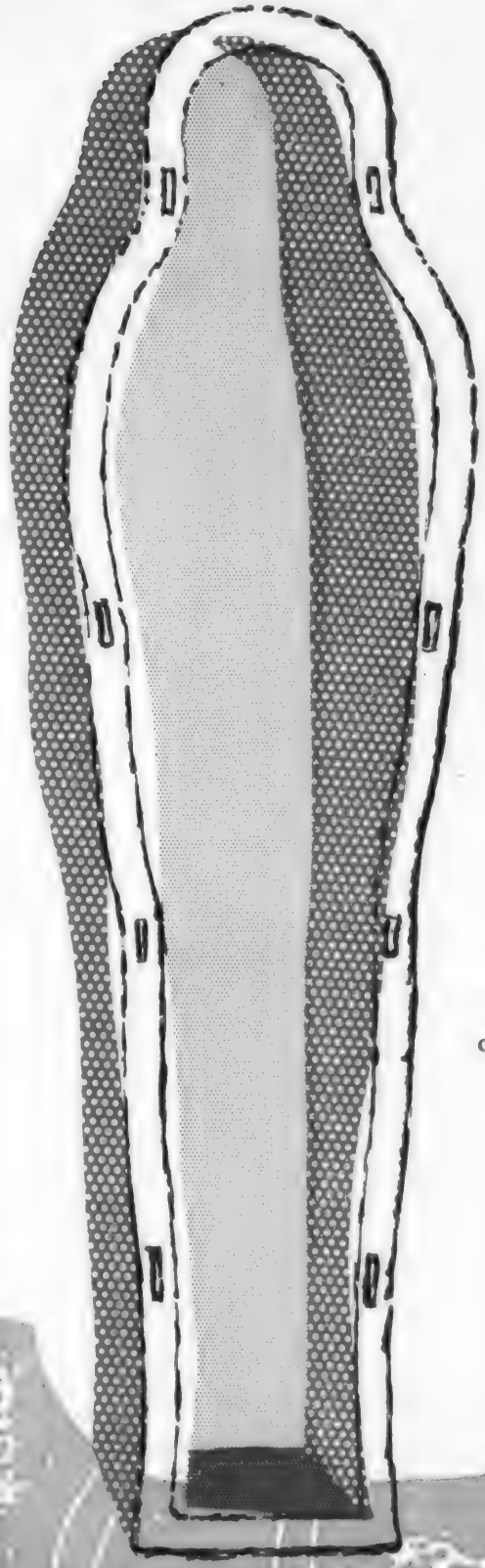

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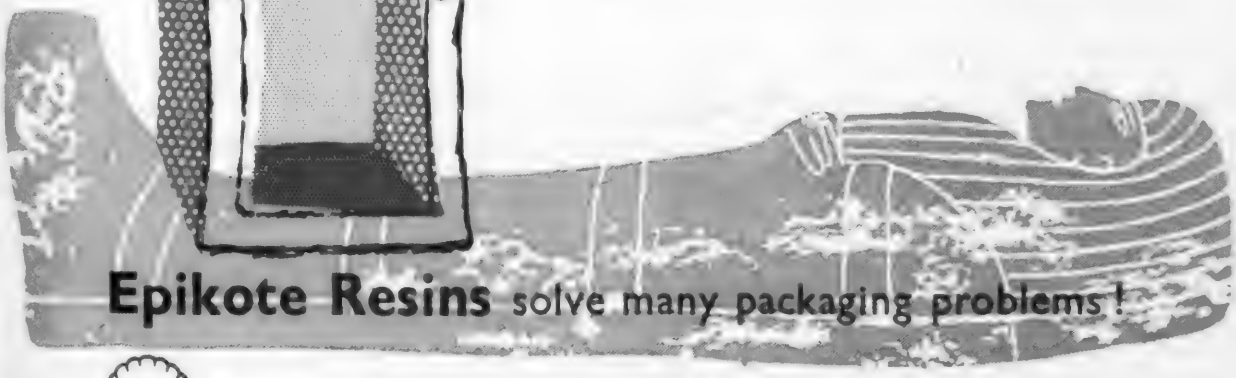

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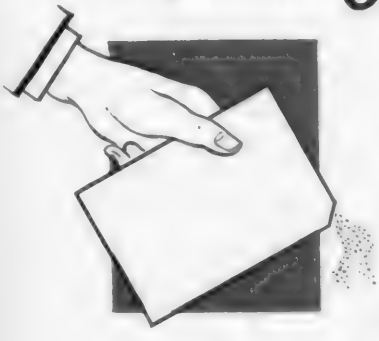
HS. 258

It can sit on his shelf

It can linger in her larder



yet it's factory fresh the day it's used!

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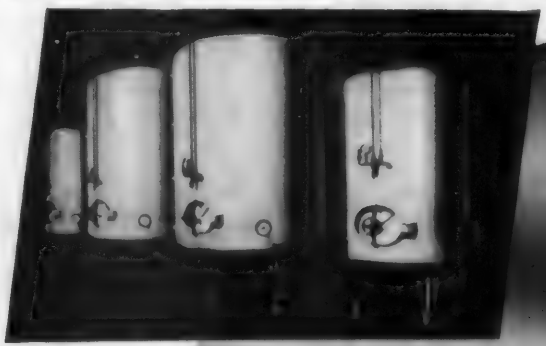

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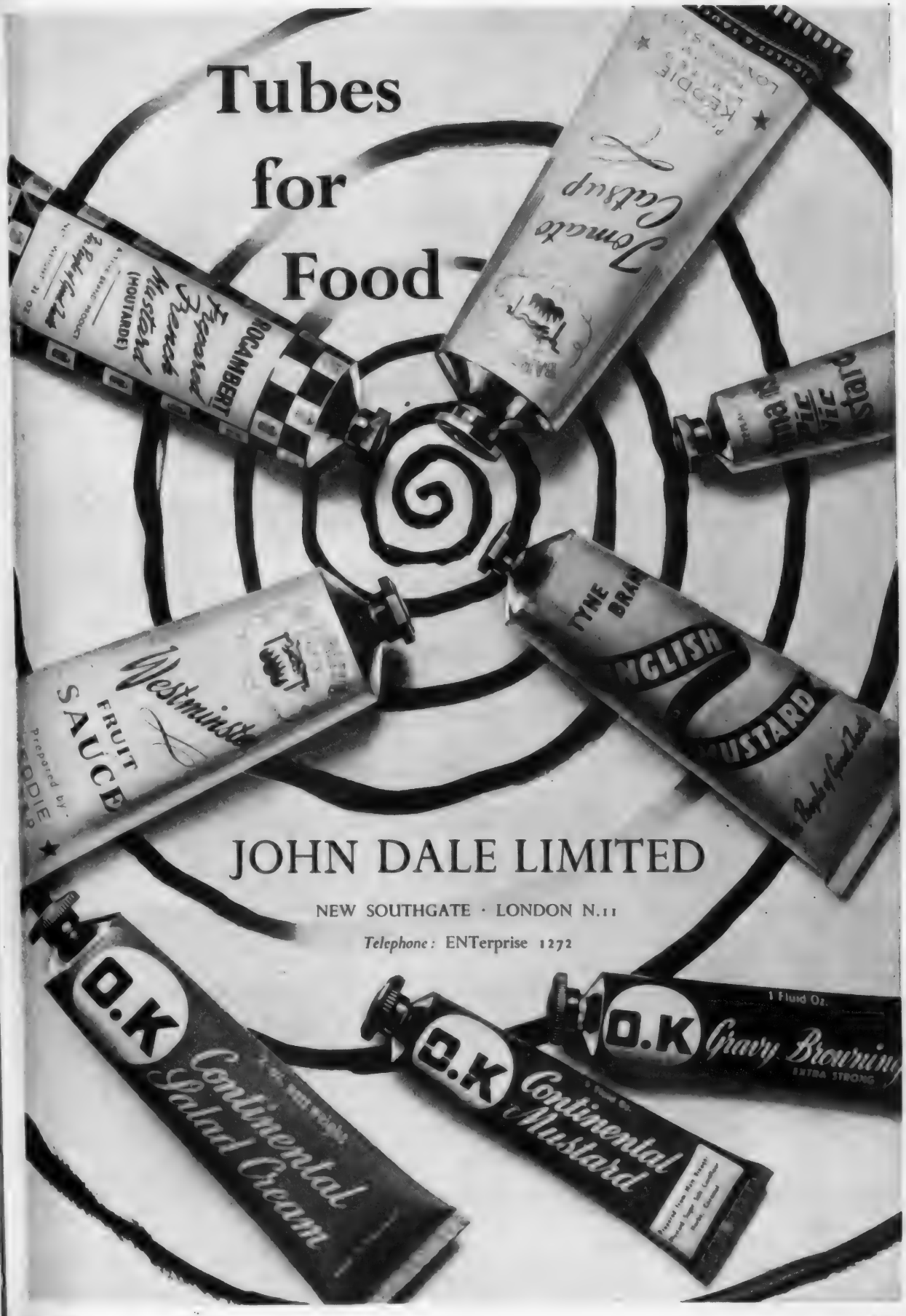
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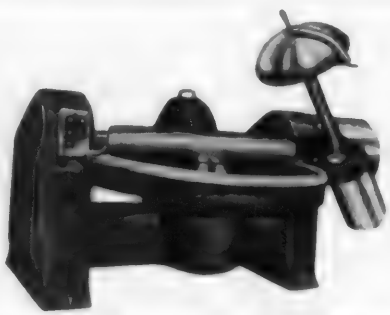

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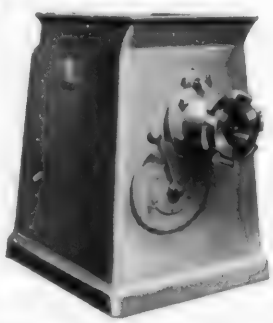

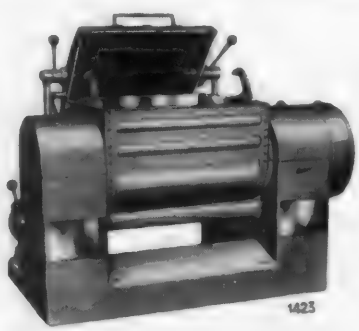

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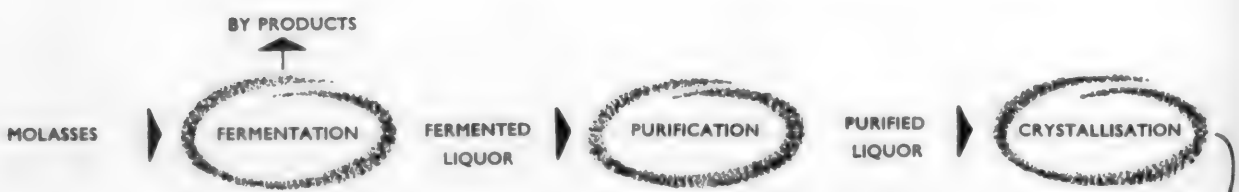

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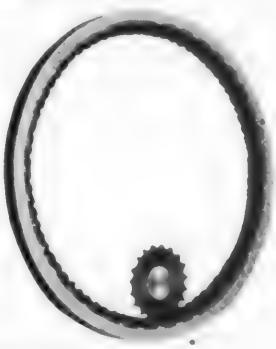

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FOOD MANUFACTURE

Vol. XXXI. No. 8 · Published Monthly · August 1, 1956

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FOOD MANUFACTURE

Vol. XXXI, No. 8 August 1, 1956

Food and pharmacology

THE ELECTION of Prof. A. C. Frazer as president of the British Food Manufacturing Industries Research Association is particularly appropriate at this stage in the history of food manufacture. Undoubtedly the use of chemicals in food processing is one of the biggest questions of the day. It is, therefore, in every way suitable that the new president is a distinguished pharmacologist who, in his department of medical biochemistry and pharmacology at Birmingham University, is carrying out research on the biological effects of substances used in food technology.

In his address at the annual meeting of the Association in London last month Prof. Frazer stressed the need to build up a body of knowledge which would enable food manufacturers to give proper assurances to the consumer that the procedures approved for use in food technology are harmless. We all know that much work is needed to determine the biological effects of food additives. The necessary work on colours alone will require years of painstaking experiments. Speaking as a scientist, Prof. Frazer was understandably cautious, but nevertheless he declared: "It is possible to measure the safe dose of a substance that causes definite toxic effects; it should not be impossible to decide upon acceptable dosage levels for those many substances used in food technology that have not been shown to cause any harmful effects. There are already a great many facts known about the chemical substances used in food technology and a considerable amount of work is in progress. Now that attention has been drawn to its importance by the work of Sir Edward Mellanby and others on agenised flour, I do not consider that there is any reason why the knowledge necessary for establishing an effective safeguard should not be obtained. It is important, however, that legislation should rest on the factual knowledge of today, not on the likely discoveries of tomorrow. . . . Legislation tends to lag behind the most active and advanced thinking in any field but, by periodic adjustment, it can be kept sufficiently up to date."

Clearly the new president of the B.F.M.I.R.A. is going to put his considerable authority behind the biological testing of additives. Almost a year ago the then president of the Association, Mr. E. E. Wells, called for a co-operative effort to get a biological testing station established. It is to be hoped that we shall now see some action on this matter which can fairly be described as one of the most important objectives of food investigation.

One man's meat . . .

ANOTHER SUBJECT for food research mentioned by Prof. Frazer is the seeking of an answer to the question of why one man's meat is another man's poison. "It is becoming increasingly clear," he said, "that the metabolic set-up inside each person is as individual as his face or his character. Indeed, all these variables are essentially dependent upon genes. In just the same way that particular work is suitable for some, but may cause a mental breakdown in others, so your food may be more or less suited to your metabolic character. If the wrong food is taken it can have disastrous effects. This is seen, for example, in children who are unable to deal effectively with wheat protein—it may cause severe malnutrition and stunting of growth, which disappears if wheat protein is taken out of the diet and comes back if it is later re-introduced."

Again, this is a subject in which Prof. Frazer is personally interested as head of the department of medical biochemistry and pharmacology at Birmingham. Dietary studies are clearly of importance to the food industry, and it is probable that in the future we shall see a bigger research effort in this direction.

New food colour regulations soon

THE RECOMMENDATIONS on the use of colours in foods published by the Preservatives Sub-Committee of the Food Standards Committee last December (see FOOD MANUFACTURE, January, p. 27) have been accepted by the Government. This means that the present Public Health (Preservatives, etc., in Food) Regulations, which prohibit certain metallic colouring matters and a number of coal-tar colours, will be amended so as to prohibit the use of all colours except those on the permitted list. This includes a number of natural colours and 32 synthetic colours.

This list will be reviewed during the next five

years, and until then the case for individual colours —either for addition to or for removal from the list —will be considered as information about them becomes available. Priority will be given to investigations on certain colours which are regarded as important but which have not been included on the permitted list because of lack of information.

Special arrangements will be made for citrus fruit, which does not always ripen with a uniform appearance because of climatic variations, but, in general, the Government accepts that colour should not be added to certain natural foods when sold raw or unprocessed. This does not apply to marking methods, of course.

Consideration of the committee's recommendations on the labelling of foods containing added colour are to be left over until a comprehensive review of the Labelling of Food Order is undertaken.

Specifications of purity will be prescribed for colours on the permitted list, and colour manufacturers and all others concerned will be consulted about the arrangements required.

The new regulations will come into effect as soon as possible, but the Government realises that manufacturers and traders will need time to dispose of stocks of food produced in accordance with the existing regulations. But the Government hopes that all who can do so, will take steps immediately to use only colours on the permitted list.

Cans without tin?

A REMARKABLE new process promises to take 98% of the tin out of more than 10 billion tin cans. The new development, the outcome of research by the American Can Co. is known as margin plating, and consists of tinplating only the narrow margins of the steel plate that form the soldered sideseams of the cans. Except for these margins, which are no more than $\frac{3}{16}$ in. wide, the cans are made entirely of enamelled steel plate.

The tinplated margins are used only to assure hermetic seals on cans for heat-processed products, and the process requires less than 2% of the tin normally used on an average-size can. Only about 0·85 oz. of tin, for example, will be used for every 1,000 margin-plated pet food cans. The company is already producing coffee and pet food cans by the new process on a limited commercial basis, and expects shortly to install equipment for making margin-plated beer cans. At present, more than 10 billion beer, coffee and pet food cans are produced annually in the U.S.A., and these categories account for more than a quarter of all the metal containers made in the country.

A further important consideration is that the production of cans for these three products by the new method may save as much as 5,260,000 lb. of a metal which is of strategic importance. Dr. R. H. Lueck, the company's vice-president in charge of research and development, stated recently that this is the longest single step the company has taken in its programme to replace tin as a can-making ingredient through the development of new manufacturing processes on alternative non-strategic materials. He pointed out that billions of tinless cans are already being manufactured by other methods for such non-heat processed products as motor oil, anti-freeze, polishes and waxes, cosmetics and drugs, detergents and insecticides. Cans for these items have cemented sideseams. The new development of margin plating may well extend this list to include as many as half of all the cans produced in America.

The new process also holds future promise for making virtually tinless cans for such additional products as meat, fish, many non-acid vegetables and various dry or vacuum-packed foods.

Olympian fare

TO HAVE to satisfy the differing tastes of 6,000 athletes from 73 countries sounds like a caterer's nightmare, but the Olympic Games housing and catering committee in Melbourne do not seem to be worried by the prospect. They have announced that Australia will supply 92% of the food to be eaten by those taking part in the games.

Competitors from far-flung corners of the world who are used to the most esoteric diets need have no fears that they will be expected to live on unfamiliar foods.

The traditional Australian dish is popularly supposed to be two fried eggs on a two-inch steak, but in fact Australia covers most of the world's climatic variations and produces most of the world's basic foods. Indeed, Chinese athletes are said to prefer the starchy rice grown in Australia along the banks of the Murrumbidgee river to their own. The small percentage of imported foods will include maple syrup from the U.S.A. and curry ingredients from India.

It is calculated that the teams and officials in the Olympic village will consume 9,000 pints of milk, 3 tons of meat, one-third of a ton of butter, 15,000 dozen eggs, 2 tons of fresh fruit and 15,000 quarts of ice cream daily.

All this will be prepared by 170 cooks, over 100 of whom have been specially recruited from Europe for the games, and will be served in 22 dining rooms by 1,240 waitresses. To make sure that competitors will be served those dishes to which they are accustomed, the committee sent each team a long questionnaire with specimen menus for 11 dietetic groups.

Poles develop their meat industry

THE CONSUMPTION of meat and meat products in Poland has risen considerably since the war. The 1939 *per capita* consumption of meat and fats was 19·6 kg. By 1954 the figure stood at 37 kg. The basis for this increase has been the establishment of an up-to-date meat industry, an almost completely new development for Poland.

The foundations were laid during the period 1950-55 covered by the six year economic plan. Large new slaughterhouses were built in Lublin and Zamość, and a big bacon factory at Krotoszyn (Poznan province) came into operation, as well as several establishments for production of sausages, ham and tinned meat. About 10,000 sq. metres of refrigerating space was made available at slaughterhouses. During the same period construction of meat processing plants began in Lublin, Płock, Zamość, Warsaw, and Wrocław.

Last year the meat industry produced 533,600 tons of meat (by comparison with 185,900 tons in 1949), and 100,000 tons of sausage products (1949—20,000 tons). Co-operatives last year supplied the public with an additional 100,000 tons of meat and sausage products.

The export market for Polish meat products is continually expanding, with Britain, the U.S.A., Germany and South America as the main purchasers. Britain is the traditional market for Polish bacon, but apart from bacon there is a big export of sausages and sides of pork. The increase in exports may be gauged from a comparison of 1949 and 1955 figures: the 22,000 tons of bacon exported in 1949 had risen by last year to 48,000, and while in 1949 total exports of ham and tinned meat amounted to only 4,000 tons, last year ham exports alone were almost 15,000 tons. By-products like albumen and technical gelatine are also coming to play an important role in export trade.

Further projects are embodied in a five year economic plan, covering the 1955-60 period. Four main new processing establishments will be built in various parts of the country and nine existing ones will be expanded.

By 1960 meat production should amount to 824,000 tons annually, sausage products to over 156,000 tons, bacon 40,000 tons and tinned meat 47,000 tons. This will mean an annual *per capita* consumption of nearly 46 kg. of meat and animal fats.

If this figure is reached Poland will become one of the half a dozen biggest European meat-eating countries, but still a long way behind such enthusiastic carnivores as the Argentinians, Australians and New Zealanders, who put away well over 100 kg. of meat a head each year.

The molasses maker

WITH A few acres, a mule and some help from neighbours, the molasses maker in the U.S.A. can be farmer, manufacturer and distributor, all in one. This highly individualistic business flourishes in the South, where the warm climate is ideal for sorghum grains.

He produces a rich sweet syrup, known both as sorghum and molasses, which serves as a topping for the traditional buckwheat cakes of the South and the corn bread and hot biscuits (scones). According to our associated journal, *World Crops*, sorghum is used mainly as a forage crop since its high sugar content make it valuable for fattening pigs, and the seeds are used to increase the output of laying hens. As meal, flour and cereal, it has found increased uses in the human diet, but it has never been a good source of sugar because of difficulty in making the juice crystallise. Recently sorghum has found industrial uses: wax, salad oil and grain alcohol are some of its by-products.

Making sorghum is hard work. Farmers rise at 2 a.m. to escape the heat of the day and work till evening, with a rest in the afternoon. The cane is cut by hand and crushed in small, primitive mills worked by mules. The juice is boiled until most of the water has evaporated and a syrupy texture achieved. During boiling a green chlorophyll residue must be scooped out of the vat or the molasses will have a bitter taste.

After about a week of co-operative effort among the farmers, the fields are cleared and the syrup boiled and bottled. Some of it is sold to local stores and restaurants, but most is used to provide the local households with enough sweetening agent to last until the next crop is sown.

Lethal rays

PUBLIC INTEREST in the preservation of food by "atomic" rays (ionising radiations) must have been whetted by the appearance on television last month of Dr. Frank Banfield, director of the British Food Manufacturing Industries Research Association. For a few minutes Dr. Banfield answered the usual questions: How effective is radiation? Does it produce off-flavours? Can it be harmful? He was rightly circumspect in his replies, thinking no doubt of the injunctions to be cautious in speculating on the method issued by authorities such as the Low Temperature Research Station. It is at this station that a group is working on these problems. In a year or two, perhaps, Dr. Banfield and other food chemists will be able to give more definite answers about radiation sterilisation.

One of the clearest popular statements on the sub-

ject which we have read appears in the U.S. publication *Atoms for Peace Digest*. One way to employ radiation sterilisation is to pack food in cans, freeze it, then expose the cans to gamma radiation from radioactive materials placed at the bottom of a deep water pool. Another is to place food wrapped in cellulose film on a conveyor belt that travels under a stream of rays emitted by an electron generator.

There is no difference between the gamma rays and electron beams in their effect on bacteria and the changes in taste and smell which they bring about in foods. There is, however, a difference in the nature of treating foods and the efficiency of the different methods used for sources of energy.

Gamma rays may be produced by radioactive elements or radioactive isotopes, or from man-made generators in the form of X-rays. In this respect, the scope of the British team's work has been greatly extended by the use of two X-ray generators. Gamma-ray treatment has better penetrating characteristics, but efficiency is rated at only a 5% maximum in power reactors which are at present available. Gamma-ray sources must be shielded when not in use.

The general advantages of electron irradiation are the efficiency of utilisation—60 to 75% of the available power can be utilised—the relative ease of operation and the need for few operating technicians.

It is reassuring to note that in this branch of technology at least British research and development is keeping abreast of American. British generators have been available commercially for some years and are among the most advanced in the world, while large radioactive sources will soon become available.

The olive oil crisis

DROUGHT, INSECTS and frost have blighted the olive producing countries—Spain, Italy, Greece, Tunisia, Algeria, Morocco, Portugal and Israel. Reporting on the olive oil industry to the 34th Congress of the International Association of Seed Crushers, Dr. G. Coppola reminded delegates that last year he had suggested the average annual production of olive oil to be about 960,000 tons. This year, he warned, we may be too optimistic if we reckon total production at 600,000 tons—about 30% below normal.

Dr. Coppola, who was outlining the main points of the International Agreement on olive oil to the congress, said that the situation is alarming. In Spain, for example, where the consumption of vegetable oils exceeds 300,000 tons per year, and where the export of olive oil occupies an extremely important place in the country's foreign trade, only 280,000 tons of olive oil were produced. Summer drought, which had considerably affected the quantity and quality of the olives, was followed by an unprecedented attack of olive fly, which caused the premature fall of the olives and a marked worsening of the quality of the oil. For a while all foreign trade in olive oil was prohibited, but limited exports were made later. Exports of oil in casks were restricted to only 1,000 tons per month, of which 70% had to be sent to the U.S.A. at a minimum price of $600 per ton. Vegetable oils had to be imported from the U.S.

A "coals to Newcastle" policy of importing vegetable oils has been necessary in almost all the olive-producing countries. Italy, which consumes 400,000 tons per year of vegetable edible oils, had to buy about 12,000 tons of cottonseed and soya oils to supplement her olive oil production of somewhere between 150,000 and 170,000 tons. Greece, which normally produces about 125,000 tons per year, was also affected by olive fly, and it is feared that consumption cannot in fact have been more than 82,000 tons. The Greek Government has banned the export of olive oil, and has bought vegetable oils from U.S.A.

Olive oil itself was included among the vegetable oils imported by Tunisia, Morocco and Algeria—"An extraordinary phenomenon," commented Dr. Coppola. These countries were all affected by severe parasitic infection.

The Portuguese Government has had to prohibit the sale of pure olive oil and has ordered that it should be sold blended with 50% of other vegetable oils, partly to meet national needs and partly to maintain traditional exports. The situation is even worse in the Eastern Mediterranean zone: Israel, for example, produced less than 10% of last year's crop.

Nor do the forecasts that can be made so far for the next season seem any better. Frost this year has already caused severe damage in Spain, France, Italy and in Greece, though the cold weather does not seem to have been particularly harmful in Portugal or Tunisia.

Hard-bitten pencils

PENCIL CHEWERS—both young and old—will welcome a new "lollypencil" invented by an enterprising American direct mail consultant and supplied in five different flavours. Teetotallers and children have raspberry- and lemon-flavoured pencils. For hard-bitten, hard-biting executive types there are Scotch, bourbon and rum flavours.

The lollypop is attached to the top of the pencil in much the same way as an ordinary eraser and it is "sanitarily and tightly wrapped in cellulose film." The pencil itself carries up to five lines of advertising copy.

The pencils are intended to be given away at conventions, meetings, etc. They should certainly liven them up.

FOOD AEROSOLS

By A. Herzka, B.Sc., A.R.I.C.

(Research Division, The Metal Box Co. Ltd.)

Pressurised-packing is an ideal way of marketing such foods as cream, salad dressing, cake topping, cheese spread, mayonnaise and the like. These so-called "aerosol foods" can be quickly and cleanly dispensed in a ready-whipped condition and their novelty and convenience are making them very popular in the U.S. In that country last year 70 million packs of aerosol foods were sold against 220 million units of non-food aerosols. So far no British food manufacturer has tried this attractive form of packaging. Here Mr. Herzka explains exactly what it is, and the materials and techniques involved.

THE so-called "aerosol" method of packing came into prominence during the last war as a convenient means of combating the insects which were plaguing the Allied troops fighting in the Far East. Heavy steel containers[1] filled with an insecticide and a liquefied gas, the vapour of which exerted a pressure of 70 p.s.i.g. at 70°F. were used. Although such containers were also marketed for civilian purposes in 1945, it was not until 1947 that the industry really came into its own. This turning point was caused by the adaptation of the thin-walled beer can as a safe container for aerosol packs with a working pressure of around 35 p.s.i.g. at room temperature.

The majority of the products packed under pressure in the way described below give rise to anything but aerosols, *i.e.* dispersions of solids in gases with the diameter of the particles up to 50 microns, and the terms "pressurised pack" or "fingertip dispensed pack" would be much more accurate.

The term "aerosol pack" has now, however, become synonymous, especially in the U.S.A., with the particular method of packing which is described here.

This is how non-food aerosols are packed: The product is packed together with a liquefied gas, *i.e.* the propellent, the vapour of which fills the headspace above the product-propellent mixture. The container is fitted with a valve and, in most cases, with a syphon tube (Fig. 1). As soon as the valve is actuated the pressure in the headspace forces the product-liquid propellent mixture up the syphon tube and through the valve aperture. As soon as a drop of this mixture passes through the spray orifice and comes into contact with the atmosphere, the liquid propellent vaporises more or less instantaneously and the product is scattered into innumerable particles, the size of which is determined by the product-propellent ratio.

Aqueous products, such as shaving cream and shampoo are dispensed as foams. In this case the propellent is emulsified with the product, and on operating the valve the propellent vapour in the headspace forces this emulsion out of the valve, which in this instance is fitted with a special cream spout (Fig. 1). On contact with the atmosphere the propellent particles vaporise within the emulsion, whipping the whole into a foam the consistency of which can be adjusted to any particular requirement by varying the amount and type of propellent.

In the systems described above the pressure in the aerosol container is governed principally by the pressure in the headspace, which is equal to the vapour pressure of the propellent. The pressure within such containers will therefore remain constant as long as a drop of liquid propellent remains. The liquid propellents commonly employed are dichlorodifluoromethane, trichloromonofluoromethane and dichlorotetrafluoroethane. A concise account of their physical properties may be found elsewhere.[2] The use of such propellents divides non-food from food aerosols. While these compounds have been classified as non-toxic and harmless,[3] this approval is restricted to their inhalation and does not at the moment include their ingestion. The large U.S. propellent manufacturers are now engaged in extensive tests to determine the suitability of such propellents for food products, but a few years are likely to elapse before conclusive evidence of their possible suitability is available.

Nitrous oxide alone or mixed with carbon dioxide is used as the propellent in aerosol food products. Getz *et al.*[4] have concluded that nitrous oxide is widely used as an anæsthetic because of its non-toxicity. It only acts as an anæsthetic in high concentrations of 90-95%, and as only 5-6 g. of nitrous oxide are used in producing a quart of whipped cream the small amount consumed in this way is obviously insufficient to produce any anæsthesia. The use of nitrous oxide with or without carbon dioxide for aerating milk products dates back to 1882, and a review of the various patents covering such applications is given elsewhere.[5]

Mode of operation

When using these inorganic propellents the dispenser contains the liquid product in which some of the gas is dissolved and the headspace is filled with gas under pressure. An equilibrium exists between the headspace gas and the gas dissolved in the product—that is, the amount of gas in solution depends upon the pressure of the gas in the can. In turn the pressure in the can depends upon the total amount of gas compressed into the can. When the valve is actuated, the product containing dissolved gas is forced out of the valve by the gas pressure in the can. Within the can the headspace is increased by the discharge of liquid, and in filling this larger space the headspace gas will exert less pressure. As the pressure is decreased some dissolved gas comes out of the solution and passes into the headspace to re-establish an equilibrium between the two phases, based on the smaller amount of gas and product then present, and the pressure gradually decreases as the dispenser is emptied. This gradual drop in pressure is the chief disadvantage encountered with this type of propellent, and the pressure available when the dispenser is nearly empty may be insufficient to exhaust the contents. Sometimes as much as 10% of the product remains. As the product containing the dissolved gas issues from the cream spout the gas comes out of solution and expands. If the product has certain characteristics it will be whipped into a foam, as is the case with cream. In other cases, the gas may leave the product with only minor frothing and without essentially altering its character or form. The foam volume obtained with nitrous oxide and carbon dioxide is not as consistent as that obtained with the liquefied organic propellents referred to above.

It has already been pointed out that both food and non-food aerosols entered the civilian market with the adaptation of the beer can to pressure packing. In fact, food aerosols made a flying start in the United States, and it is interesting to quote from a recent review of dairy products packaging.[6]

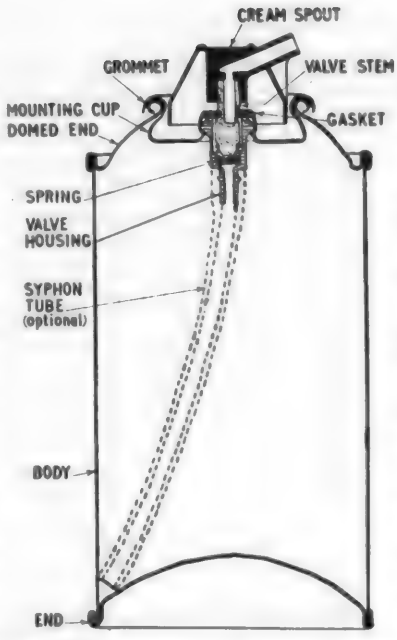

Fig. 1. The anatomy of an aerosol pack. It has a nylon Precision valve and a cream spout.

"It is a tribute to the dairy industry's packaging alertness and willingness to try new forms that it was among the first big users of the aerosol-type pressurised container, when these packages were considered merely curiosities. The tremendous success of "Reddi-wip" and others has built up a volume use of 50 million of these specialised whipped cream aerosols a year—bigger than the combined total for the entire insecticide field. Consumers were quick to accept this new convenience—whipped cream that can be kept in the refrigerator for many days, ready to apply at the touch of a button, with no waste or bothersome preparation."

Sales of food aerosols in the U.S.A. in 1955 are estimated at 70 million units, limited almost entirely to whipped cream and cake topping, against an estimated 220 million units for non-food aerosols.

A big increase of food aerosols sales in the U.S.A. is expected during 1956.[7] At the moment no food aerosols are marketed in the United Kingdom.

Container and valve

The tinplate dispenser as shown in Fig. 1 is suitable for the packing of food aerosols, and it is available with nominal capacities of 6 and 12 oz. It is internally lacquered because plain tin may affect the flavour of the product. In the United States the container is very often waxed in addition to being lacquered. Waxing, however, precludes a sterile pack of which more will be said later. The cans are tested to withstand momentary pressures of 130 p.s.i.g. for a few seconds, though there is very little danger of explosions because the internal pressure does not rise proportionately to the temperature. In fact, the solubility of the gas in the fat increases considerably as the temperature increases so that a pressure of 82 p.s.i.g. at 40°F. is still only 100 p.s.i.g. at 90°F.[8]

The majority of American food aerosols are fitted with valves of the "Super Whip" type,[9] but the all-nylon Precision Valve (Figs. 1, 2, 3) is equally suitable. Its single metallic part, the valve spring, is made from stainless steel with a passivate finish. This valve can be sterilised at 150°C. without impairing its subsequent efficiency.

Composition

Generally, cream with 30% butterfat is used. The mixture consists of the cream, 5-10% sugar, flavour (usually vanilla) and less than 0·5% stabiliser. The quantity of stabiliser used depends on the butter contents and age of the cream and on the type of the stabiliser itself.

Examples of such stabilisers are sodium alginate, sodium caseinate, dehydrated egg albumen, gelatin, Irish Moss and locust bean gum. Some of these may be added to cold cream while others require the cream to be at 140°F. for thorough mixing. It will thus be realised that the fat contents of pressure-packed cream is lower than the minimum required for manual whipping. In *synthetic* cream, soya protein and/or hydrogenated vegetable oils replace the cream.[10, 8]

Packing procedure

The majority of American food aerosols employ an internally waxed container and are packed in the following manner:

After mixing the cream with the desired quantities of sugar and stabiliser at 120° to 140°F., the mixture is pasteurised under agitation for 30 min. at 170°F., cooled to 40°F. and the flavour added. Approximately 7 fl. oz. of the mixture are then filled into a 12-oz. dispenser and the latter sealed by swaging the mounting cup containing the valve into the 1-in. opening. It is advisable to flush the headspace with an inert gas before sealing the can.[11] The dispensing valve is then attached to the gassing plant by suitable means and the gas is fed through the valve at a predetermined pressure, usually 80-90 p.s.i.g. at 45°F. while the dispenser and its contents are vigorously agitated to cause the gas to dissolve rapidly in the product.[12] Gassing and agitation are continued until no more gas will dissolve at the pressure used and the system is in equilibrium. This usually takes 20-30 sec. As the dispenser is disconnected from the gassing machine, the dispensing valve closes automatically and no gas can escape from the dispenser. The final pressure of whipping cream is usually between 65 and 85 p.s.i.g. at 40°F., and the dispensers are kept at that temperature, *i.e.* refrigerated, until used.

The necessity for refrigerated storage and transport with this type of pack might explain why food aerosols have not yet made their appearance in this country. If, however, the container is only internally lacquered and not waxed, a sterile pack is possible and this method should commend itself to U.K. manufacturers.

The main steps in producing a sterile pack are preheating, homogenising, filling, sterilising and gassing.

Before homogenising, the cream should be heated to 150°F., either in continuous heat exchangers or in jacketed pans. The stabiliser should be added at least 1 hr. before preheating. The cream is homogenised at a pressure of 2,500 to 3,000 p.s.i. in a dairy-type homogeniser.

Fig. 2. Pack with flexible inner lining, suitable for viscous products such as cheese spread and salad dressing. As there is no contact between the product and the propellent it is possible to use organic propellents such as those used for non-food aerosols. The pack is shown in the position in which it is used.
Br. Pat. 740,635

Filling

The cream is heated to approximately 170°F., either in a heat exchanger or in a steam-heated batch tank which is large enough to hold one retort load and filled into the aerosol containers at the rate of 7 fl. oz. per 12 oz. container. These are then closed immediately by swaging the mounting cup containing the valve into the 1-in. opening.

Sterilising

To increase the heat penetration and to prevent caramelisation, the cream should be sterilised in agitating retorts. A speed of rotation of from 6-8 turns per min. is satisfactory for batch retorts, but continuous cookers are preferred for high-speed production.

A dispenser containing 7 oz. of cream should be processed 20 min. up to, and 20 min. at, 240°F. After processing the dispensers should be immediately cooled in water. (The fat content of the cream should not be so great that solidification of the cream occurs during sterilisation; about 25% butterfat content is suggested.)

Gassing with the propellent then follows as described above.

Novel method of packing

A novel method of packing food aerosols has been published as a United States patent.[13] The dispenser is filled with gas to a pressure of approximately 75 p.s.i.g. and the necessary amount of cream is then forced into the can in a thin stream dispensable in droplets under a pressure of 100 p.s.i.g. The patent prescribes the use of a hypodermic needle of various designs and the use of a self-sealing rubber diaphragm. By propelling the cream into the already pressurised dispenser at high velocity the incoming cream is presented to the gas in the form of a thin film trickling to the bottom down the sides of the dispenser, or if the velocity is high enough, in the form of shattered droplets so that the ratio of its area to its volume is enormously increased, thereby creating a condition conducive to rapid gas absorption without the need for agitation. The patentee claims that 8 oz. of cream can easily be filled into the dispenser in 30 sec., and that with a battery of 10 needles a filling capacity of 600 dispensers per hr. is possible.

Over-run and stability

The over-run is determined by weighing a given volume of whipped cream and comparing with the volume of an equal weight of liquid cream. By varying the ultimate pressure it is possible to alter the over-run and the stability, *i.e.* rigidity of the whip, to suit different requirements. A concise account of these and other quality factors is to be found in the literature.[5]

Viscous products

Graham[8] has listed a number of food products the viscous nature of

Fig. 3. The pressurised pack in action. This one has a nylon Precision valve—its single metal part, the spring, is made from stainless steel with a passivate finish.

which precludes their packing as aerosols in the conventional manner. Among these are salad dressing, cheese spread, mayonnaise and the like. A different method of packing has to be adopted for such products. A metallic container, having a flexible inner lining which contains the product, is ideally suited for this purpose.[14] The inner container is attached to the valve (Fig. 2) in such a way that a space is left between the outside of the bag and the metallic outer container, this space being occupied by propellent vapour. As there is no contact between the product and the propellent, it is possible to use the organic propellents normally used with non-food aerosols. A very small amount of liquid propellent, as shown on the diagram, suffices. The propellent vapour exerts a pressure on the flexible inner and the product is expelled when operating the valve. Apart from viscous food products this method is also called for when packing products for which aeration is not desired or with products where contact with the propellent is undesirable. Tests carried out in the United States have shown that tomato sauce will absorb about 50% of the nitrous oxide in one month, leaving very little pressure in the dispenser, with the product turning a light orange in colour. When using the method described the container can be completely emptied and shaking before use is unnecessary.

A recently published invention[15] for the packing of viscous products under pressure without aeration recommends the use of nitrogen as propellent. The patentee suggests an internal pressure of between 120 and 150 p.s.i.g. which obviously necessitates the use of heavy walled containers and need therefore not be discussed further.

In conclusion, it is interesting to note that aerosol beverage concentrates, in seven different flavours, are being marketed in the United States for the first time.[16] These concentrates are sprayed into still or sparkling water resulting in home-made soft drinks not requiring any further sweetening. A mixture of carbon dioxide and nitrous oxide is used as propellent.[17] According to the manufacturer these aerosol-packed concentrates may also be used for the flavouring of ice cream sodas, hot spiced drinks, desserts and puddings.

Let it be hoped that food manufacturers in this country will soon enter the promising food aerosol market.

Acknowledgments.—I wish to record my thanks to Mr. R. K. Sanders, Director of Research, and to Mr. J. H. Brittain for permission to publish this article, and to Mr. G. J. Budds for his helpful suggestions.

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"Tamed" Iodine in the Dairy

"TAMED" Iodine compounds have been developed in the U.S.A. as dairy cleaning and sterilising agents. In the past, the use of iodine for this purpose and for the sanitation of eating utensils and canteen equipment has been hampered by its corrosive action on metal and plated ware.

More correctly termed "iodophors" the new compounds are nonionic wetting agents which "carry" iodine and release it when the iodophor comes in contact with water. They have very little of the characteristic odour of iodine and do not stain the skin. Furthermore, the strength of a solution which will be effective can be gauged by its colour. Tests to assess their value in dairy sanitation show that they do not corrode tinned steel and stainless steel.

The use of *Atlas* surface active agents for the solubilising of vitamin and essential oils in transparent emulsions, is described in the latest bulletin put out by Honeywill-Atlas Ltd.

Fermented Drinks and Nutrition

By E. C. Barton-Wright, D.Sc., F.R.I.C.

While flavour, palate and related factors rather than nutritional values may well have been of primary importance in bringing about mankind's widespread use of beer and other fermented drinks, the evidence adduced in this article clearly shows that these beverages taken in moderation make a useful contribution to the general daily diet. Beer, for instance, undoubtedly contains useful amounts of many members of the vitamin B complex; with regard especially to riboflavin and niacin, for which recommendations as to minimal allowances have been made. Even such a modest consumption as a pint a day will make a significant contribution towards meeting dietary requirements.

ALTHOUGH the discovery of naturally fermented drinks is lost in the mists of antiquity, the possibility that they may be of nutritional importance in human diet is a comparatively recent development.

In the early days of vitamin chemistry when vitamin B was considered to be a single entity, an examination of beer appeared to show that it was entirely lacking in vitamins. This was certainly unfortunate, because although the thiamine, or vitamin B_1 content of beer is very low or even non-existent, many other members of the vitamin B complex are present in significant amounts.

Historical evidence

As has been remarked, the discovery of fermented drinks is a very ancient one. With the exception of beer, which is rather a special case, these naturally fermented drinks, such as wine and toddy, which is made by the natural fermentation of the sap of the coconut or date palm, were no doubt accidentally stumbled upon by Neolithic man in his early experiments in agriculture.

Apart, however, from the feeling of well-being engendered by the consumption of alcoholic drinks, the ancients appear to have had a quite definite belief that they played some valuable part in the general diet.

They also realised that unfermented fruit juice, *e.g.* the must of the grape, and the sap of the date palm, when concentrated, or preserved in some way, were important additions to the daily diet. In fact, this particular point has been used as an argument by some extreme teetotallers that the ancients considered that the consumption of fermented liquors was an unmitigated evil and that the authorities did their best to suppress this wicked trade.

There is actually no substance in this argument. It is true that indulgence in strong drinks, including beer, appears to have been somewhat of a vice among certain classes of Assyrians, and that this sometimes resulted in drunkenness. There are descriptions, evidently based on precise observations, of every stage of the symptoms, or at least the warning signs, available. There is a curious medical text in existence from which we may infer that Assyrian families kissed when they said good morning, and that the ladies of the household objected strongly if the man was suffering from a hangover. As has already been said, the intoxicating properties of alcohol were well known to the Assyrians, and medical opinion took them seriously, treating drunkenness as if it were an actual case of poisoning. The method of cure was as follows: "If a man has drunk too much strong wine (toddy) and his speech becomes blurred, if his thoughts wander and his eyes are glassy, the cure is (then follows a list of 11 drugs) and to mix them with oil and wine at the approach of the goddess Gula (evening). In the morning before sunrise, and before anyone has kissed the patient, let him take the draught. He will recover." Nevertheless, there is no evidence that the moderate consumption of alcoholic drinks was frowned upon anywhere in the Ancient World.

Instinct plays a big part in the animal kingdom in the selection of correct diet, and it is possible that this same instinct in primitive man may have led him to use fermented drinks as an adjunct to his diet.

References to fermented drinks abound in the literature of the older civilisations of Assyria, Babylonia and Egypt, and it is clear that these ancient people did not consume alcoholic liquors merely on the ground that they produce a temporary feeling of exhilaration and well-being.

The recent investigations of Anderson *et al.*[1] on the food habits of the Otami Indians are of great interest in this connection. This tribe lives in the Mazquital Valley in Mexico and their general health and well-being were found to be good, although their daily diet by Western standards contained few of the foods usually considered essential for a balanced diet.

The greenstuffs consumed by these Indians consists of purslane, cactus fruit, pigweed and sow thistle. Their consumption of meat and dairy produce is low, and they drink "pulque," which is made by the natural fermentation of the sap exuded by the cut inflorescence of the *Agave* plant.

This would appear to be a very inadequate and unbalanced diet, but a chemical analysis carried out by Cravioto *et al.*[2] showed that it provided a better nutritional combination than that eaten by a group of town-dwellers in the United States.

If a further example is required that fermented drinks make a real contribution to the nutritive value of a diet, there is surely none better than the penulti-

mate shocking and horrifying siege of Jerusalem by the Romans in A.D. 61.

The siege of the city lasted just on five months (May to September). A worse time could not have been chosen by the Jewish leaders to try final conclusions with the foremost military power of the age, because Jerusalem was greatly overcrowded with pilgrims who had come up from the country for the Feast of the Passover. This fact, together with the insensate folly of an outbreak of civil war within the walls of the beleagured city, resulted in one of the factions destroying most of the meagre food supplies that were available, so that the garrison and citizens were forced to rely on wine as practically the only means of keeping themselves alive.

The main studies on the nutritional value of fermented drinks have been carried out on beer. Interest was revived in the subject during the last war, mainly because beer was found to contain significant quantities of a number of vitamins belonging to the vitamin B complex. But more recently some investigations have been carried out on the nutritional qualities of wine and Kaffir beer.

The nutritional value of fermented drinks

The nutritional value of any fermented drink, be it beer or wine, must be considered under five heads: (1) the alcohol content; (2) the carbohydrate content; (3) the nitrogen content; (4) the mineral content; and (5) the vitamin content.

Beer has been taken for a general consideration of the nutritional value of fermented drinks, because the great majority of investigations have been made on this particular drink, and the author himself took part in these investigations.

Alcohol

The alcohol content of beer depends upon three main factors: the original gravity of the wort, mashing temperature and the attenuative power of the pitching yeast.

The nutritional value of alcohol is strictly limited and its sole action is as an immediate source of energy to the body. It differs from most other energy-providing foods in that it can be absorbed from the stomach, although more slowly than from the intestine. After absorption, the bulk of the alcohol is rapidly metabolised to carbon dioxide and water; the remainder being excreted in the urine or in the breath. The limited role of alcohol, in spite of the fact that it is so rapidly absorbed and requires no digestion, is partly due to the absence of any storage mechanism for alcohol in the body.

Alcohol taken in large doses acts upon various parts of the body, including the central nervous system. The effect produced is mainly dependent upon the concentration in the blood, although it is also influenced by the rate at which this concentration is attained. The digestion of food is unaffected by the intake of small doses of alcohol by the normal healthy individual, and compared with sugar the gain in fat is the same when calorific equivalents of both are given alternatively in excess of the basal ration.

Original gravity for original gravity, other things being equal, bottom fermentation, or lager, beers contain less alcohol than top fermentation pale ales. Provided that mashing has been normal, the alcohol content of a particular sample of beer will depend upon the attenuative power of the pitching yeast; and, broadly speaking, top fermentation pale ale yeasts appear to have greater attenuative power than bottom yeasts, possibly owing to the fact that higher temperatures are employed in top fermentation systems.

Carbohydrates

The breakdown of starch at mashing provides the bulk of the dry matter of the extract. In worts, prepared by either the infusion or decoction method of mashing, the following hexose sugars and oligosaccharides are present:

> fructose, glucose, sucrose, maltose, two trisaccharides, one, and sometimes two, tetrasaccharides, pentaose . . . up to 12-unit oligosaccharides.

The order of assimilation in the course of fermentation is quite definite and regular, and is: glucose, fructose, sucrose, maltose and the two maltotrioses. In a "sticking" or "hanging" fermentation, appreciable amounts of maltose and maltotriose are left as an unfermented residue. An average barley may be considered to contain some 60% starch and 10% protein. From an average wort containing 11% of carbohydrates and 0·4% of nitrogenous matter, the final beer will contain roughly 3% of carbohydrates, 0·4% of alcohol and about 0·3% of nitrogenous matter. The sequence of reactions in fermentation therefore seems one of loss. Nevertheless, the loss is mainly of carbon dioxide formed from the conversion of fermentable sugars to alcohol, and from this point of view there is little decline in nutritional value.

As has already been pointed out, the carbohydrates present in a normal wort are degradation products of starch, and there is no reason to suppose that the body cannot digest the portions remaining in beer. The amount is not large, but nevertheless, about one-third to one-half of the energy value of beer is due to carbohydrates.

The calorific value of a brewing material, or the fermented product, can be calculated from its composition on the basis of the following calorific values per gram of the four basic constituents as determined in a bomb calorimeter: carbohydrates, 4 calories; fats, 9 calories; proteins, 4 calories; ethyl alcohol, 7 calories. With the exception of protein, these basic food components are oxidised to carbon dioxide and water in the body, just as they are in the bomb calorimeter, and therefore the output of heat in the human organism is the same as in the calorimeter. Protein, however, is less degraded in the body, since nitrogen is excreted in the form of urea and other nitrogenous substances which are themselves combustible. The calories lost through excretion must therefore be de-

ducted. This loss may be safely ignored as far as beer is concerned owing to its small protein content, relative to the other constituents.

Since beer contains no fat, the calorific value will depend solely upon the carbohydrate, protein and alcohol content. A fairly accurate assessment of the calorific value of beer may be obtained by multiplying the total solids (virtually carbohydrates) by the factor 4, and the alcohol content in grams by the factor 7 and adding the products together. As a general rule, more than half the calorific value of beer will be found to be due to its alcoholic content.

According to Norris[3] the calorific value of beer shows a fairly wide range, and may be 120 calories per pint for the mildest of mild ales to approximately 400 calories per pint for the strongest. Norris has pointed out that the calorific value of a beer bears a close relation to the original gravity of the wort, *i.e.* to the specific gravity of the wort before it is pitched with yeast and the fermentation process completed. Norris gives an example of the calculation of the calorific value on the basis of this relationship, and it will be seen how closely calculated and experimental values agree.

Original gravity of sample of beer 1,033·2 (water = 1,000). The calorific value of this beer should be $(1{,}033{\cdot}2 - 1{,}000) \times 5{\cdot}25 = 174$ calories. The value found experimentally was 177.

It should be mentioned here that the calorific, or energy value of a beer is only one aspect of its nutritional worth. In the over-all assessment of the nutritional value of a particular article of diet, all the nutrients must be considered individually.

Nitrogenous matter

The total nitrogenous content of beer is made up of a mixture of protein fragments, of the nature of high molecular polypeptides, lower peptides and some amino acids.

All ten of the "essential" amino acids of Rose: arginine, histidine, *iso*leucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine are present in wort in variable amounts. As far as the essential amino acids in free form are concerned, between 80 and 90% of nine of these are utilised by the yeast for metabolic purposes in the course of fermentation, and in top fermentation systems, 100% of the methionine. Thus the concentrations of free amino acids left at the end of the fermentation are extremely small.

Considerably larger quantities of free amino acids of course become available for human nutrition as the peptides and high-molecular nitrogen compounds which are unassimilable by yeast, and therefore remain in the beer, undergo hydrolysis in the digestive tract; and this is no doubt the basis for the suggestion made by Scriban[4] that beer cannot be ignored as a source of essential amino acids.

The author[5] found appreciable amounts of the essential amino acids in wort, and the effects of concentration should also be borne in mind when the practice of the ancients of preserving unfermented drinks by concentration is considered. As far as the Assyrians and Babylonians were concerned, it was the sap of the date palm and wort which were subjected to this treatment; on the other hand, the peoples of the Middle East are essentially drinkers of wine and their unfermented drink was concentrated must. Here we are in a position to assess the free essential amino acid content. Castor[6] has shown the presence of 14 free amino acids in the must of 7 varieties of California grapes, including 9 essential amino acids: arginine, histidine, *iso*leucine, lysine, methionine, phenylalanine, tryptophan and valine. The concentrations of these acids in the must varied between 0·095 g./l. (valine) and 0·12 g./l. (lysine), besides, of course, quantities present in the combined state. If the must were concentrated to a third or a quarter of its original volume, or even less, which was the practice among the peoples of these ancient civilisations, ingestion of reasonable amounts of the concentrate would contribute appreciable quantities of the essential amino acids to the diet.

Mineral salts

Nutritionally valuable salts of calcium are present in beer in variable amounts. The concentration of calcium in finished beer depends upon the type of beer and the conditions of brewing. According to Norris[3] the figures vary between 25 mg. and 270 mg. per pint. This is certainly a very wide range. The average figure appears to be 80 mg. per pint (142 p.p.m.) for mild beers and pale ale, with a somewhat higher figure for stouts. Stone *et al.*[7] reported an average of 46 p.p.m. in 39 American beers. Phosphorus is present on the same scale, and the calcium/phosphorus ratio is approximately 1. One pint of beer containing 80 mg. of calcium would contribute roughly 10% of an adult man's daily requirements of 800 mg. calcium.[8]

Unfortunately it is not known at the present time what proportion of this calcium and phosphorus is available to the body. Phytic acid is present in beer, and although phytic acid is not absorbed by the body, it combines with calcium and iron and the amounts thus taken up may to some extent be lost, metabolically speaking, depending upon the availability of vitamin D. In the circumstances, all that can be said at present is that some part of the calcium and phosphorus present in beer may not be nutritionally available.

The nutritionally available elements—iron, copper and manganese—are present in traces in beer, but whether they make any significant contribution to an adult man's daily requirements is not known.

The sodium content of beer is relatively low, averaging 71 p.p.m. in 39 American beers; potassium averaged 255 p.p.m. (Stone *et al.*[7]) Salts of these elements may be highly important to workers engaged in heavy industry, especially those who have to work in abnormally heated atmospheres, such as iron foundries and blast furnaces. Men who have to work under such conditions tend to lose abnormal quantities of salts through excessive sweating and

excretion. Beer drinking among such individuals is generally high, because the heavy loss of moisture from the body due to the great heat cannot be replaced by drinking ordinary potable water without the worker becoming seized with severe cramp. At the same time the sodium content is sufficiently low to permit inclusion of beer in the diet even when certain health conditions may require sodium restriction.[9]

Vitamins

It is undoubtedly in the field of vitamin chemistry that the most important results have been obtained concerning the nutritional qualities of beer. The start of these investigations was certainly not auspicious. In the early days of vitamin chemistry, beer was considered to be totally devoid of vitamins. It was not realised at that time that vitamin B was not a single entity but a complex of many vitamins, and for something like 20 years all interest in the vitamin content of beer simply lapsed.

However, with the discovery of new member after new member of the vitamin B group in the 1930's and 40's, interest revived, and the advent and perfection of microbiological methods of assay contributed to a realisation of the nutritional possibilities of the vitamins present in beer. At first attention was concentrated on thiamine (aneurin), riboflavin and nicotinic acid, but other vitamins have now been added to the list, such as biotin, pantothenic acid and pyridoxin or vitamin B_6.

Thiamine (aneurin)

Thiamine is present in barley, and there is a certain amount of loss during malting and kilning and a little during mashing and boiling of the wort. At fermentation, however, there is a dramatic change, because most of the thiamine content of the wort is taken up by the actively metabolising and growing yeast, and only an insignificant residue is left in beer. Beer, therefore, cannot be considered as a nutritionally valuable source of this vitamin. The story, however, is quite different with the other members of the vitamin B complex.

Riboflavin

Barton-Wright[10] and Hopkins[11] reported simultaneously that beer contained from 0·47 to 1·2 μg./ml. of riboflavin. There is an increase of this vitamin during malting and fermentation, although it must be mentioned here that Barton-Wright's and Hopkins's figures for malt were hopelessly wrong, because it was not appreciated in the early days of microbiological assay what an all-important part correct extraction procedure plays in the matter. The earlier results have now been corrected by Tullo and Stringer.[12]

They followed the fate of riboflavin throughout the brewing process, and found that there was possibly a small loss of this vitamin at mashing, but that practically the whole of the riboflavin present in hops and malt is extracted in the wort. Boiling in the copper does not affect the riboflavin content, but there is a gain of over 100% of the vitamin during fermentation, due to active excretion by the yeast. Beer, therefore, contains twice as much riboflavin as the original wort, while the yeast crop contains from 10 to 20 times as much as the pitching yeast.

Tullo and Stringer were also able to confirm Hopkins's report that 100 ml. of beer contains on the average 1 μg. of riboflavin for each degree of original gravity, the variation being from 0·5 to 1·45 μg. depending on the type of beer. A pint of beer of original gravity (say 1,040 O.G. or 11·2% Balling) would thus furnish in the neighbourhood of 0·25 mg. of riboflavin, as compared with the recommended minimal allowance of 1·6 mg. daily for an adult man.

The niacin content of barley, malt and beer was examined by Barton-Wright,[13] who showed that in barley the content appears to vary with different varieties from about 90 to 120 μg./g. In the case of malt, the range is not so great (90 to 110 μg./g.). This author showed that niacin is apparently very stable in beer and is not lost over long periods of time. For instance, he examined a sample of strong ale brewed in 1798 to celebrate Nelson's victory over the French at the Battle of the Nile and found 17·5 μg./ml. of the vitamin still present. In samples of other beers brewed in the nineteenth century, or in the early years of the present century, the niacin content ranged from 10 to 16 μg./ml., and in samples of modern beers from 8 to 17 μg./ml. One exceptional sample examined by Barton-Wright, "Chancellor," brewed at All Souls College, Oxford, in 1938, had the abnormally high content of 45·6 μg./ml.

It should also be mentioned that for this particular beer the riboflavin content was also abnormally high, 4 μg./ml.

If the assumption be made that the average niacin content of a modern beer is 10 μg./ml., a pint would contain 5·6 mg. Thus, a daily intake of a pint would make a substantial contribution to the daily requirements of this vitamin, which is considered to be 15 mg. for an adult man.

Pantothenic acid

The pantothenic content of barley and beer has been investigated by Hopkins, Wiener and Rainbow.[14] From 4 to 6 μg./g. of pantothenic acid was reported as present in barley, but these values are almost certainly too low owing to the inadequacy of the method of extraction with papain and takadiastase. The correct values are probably nearer 12 to 18 μg./g.

On the other hand, the values these authors obtained for beer (0·4 to 0·6 μg./ml. may be taken as being substantially correct, because in mashing much the same process of extraction is in operation as Hopkins and Rainbow found suitable for extraction of this vitamin from barley. Thus, there must be a substantial loss of this vitamin in the spent grains.

Biotin

The biotin contents of barley, malt, hops and beer have been very fully investigated by Lynes and Norris.[15] These authors found a 23% to 79% increase in biotin at malting. The amount in beer ranged between 0·0061 and 0·0147 μg./ml.; the concentration being related to the original gravity as mentioned above for riboflavin.

Vitamin B_6 complex

The vitamin B_6 complex is composed of three members—pyridoxin, pyridoxal and pyridoxamine. The equivalent of 0·5 to 1·2 μg./ml. of pyridoxin in beer has been reported by Barton-Wright.[16] Substantially the same figures have been reported by Hopkins and Pennington;[17] their average value for barley, however, 3·2 μg./g. is too low, as are also Barton-Wright's figures. Morris *et al.*[18] found 15 μg./g. for wheat, and the true pyridoxin content of barley is far more likely to be in the region of this figure.

Other vitamins in beer

The presence of folic acid in beer is very doubtful, and no quantitative data are available for *p*-aminobenzoic acid and choline. *Para*-aminobenzoic acid appears to be present in cereals to the extent of 0·05 mg./100 g., and the amounts of choline in numerous cereals and cereal products are substantial; generally over 100 mg./100 g. Qualitative tests by the author have shown that the choline content of beer is substantial, but unfortunately quantitative data are lacking.

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Record Output of Vegetable Oils

WORLD production of vegetable oils in 1954-55 was the largest ever recorded according to *Vegetable Oils and Oilseeds, 1955*, published by the Commonwealth Economic Committee, (H.M.S.O. 5s. net). The total world output was some 4% greater than in the previous season and approximately one-third greater than in 1938-39. Supplies available per head of the population were appreciably greater than before the war, notwithstanding the large increase in world population. Furthermore, a relative decline in the utilisation of vegetable oils for technical purposes, including soap production, in some countries has increased the proportion of the world output available for margarine and other foods. Preliminary details for 1955-56 indicated that world production would again be at a very high level, apart from some decline in olive oil production in the Mediterranean region.* Commonwealth countries again accounted for nearly one-quarter of the world oil and oilseeds output in 1954-55, and for some 30% of world exports. Prices of edible and edible-industrial oils declined in the early part of 1955 and, in spite of some recovery late in the year, were lower on average than in 1954.

Commonwealth exports showed some increase during 1954, principally as the result of record shipments of groundnuts, palm kernels and palm oil from Nigeria; supplies from India remained low, and increased shipments from New Guinea, Papua and the Pacific Islands did not compensate entirely for reductions elsewhere, notably in Malaya and Ceylon. In 1954 the Commonwealth was a net exporter of vegetable oils and oilseeds for the second successive year. In pre-war years the Commonwealth had large export surpluses of the edible and edible industrial groups. The Commonwealth export balance probably rose again in 1955, following heavy shipments of groundnut oil from India. Canada, Australia and Pakistan are now the only other notable net importers within the Commonwealth. In 1954, as the result of heavier groundnut and groundnut oil exports and reduced imports of coconut oil, South Africa became a net exporter for the first time.

The review contains detailed statistical appendices showing, for the main consuming countries, the supplies of vegetable oils, the annual production of margarine and compound cooking fat, and the quantities of the various oils and fats used in these commodities. There is a section on import duties on oils and oilseeds in importing countries and an analysis of world production, trade and prices of whale oil.

* See page 316.

Fish Dehydration—A Warm Air Process

Experiments carried out by the Torry Research Station to produce an improved form of dried fish resulted in the development of a new process of warm air drying, which was successfully used in full-scale production. This article is a summary of a report* which records the experience gained and the results achieved during Torry's investigations.

ALTHOUGH fish in dried form has been known for thousands of years and there is still a large trade in traditionally dried and salted products, their intense, characteristic, "cured" flavour, their toughness which resists reconstitution and their excessive saltiness make them unacceptable to most British consumers, who are now acustomed to fresh fish.

Various attempts have been made in the past 75 years to dry fish in such a way that it keeps well and reconstitutes in a form comparable with fresh fish. An investigation was carried out during the last war on the possibility of producing a palatable dehydrated fish that would be compact and simple to use. A further requirement of any product likely to be useful in wartime was that it should remain in edible condition for a reasonable storage period even under tropical conditions. A number of methods of drying were investigated.

Drying methods investigated

Drying in a batch steam-jacketed dryer of the type used for fish meal and industrial wastes resulted in a loss of texture and some scorching even when only 5 lb. per sq. in. steam pressure was used.

Roller-drying was found on an experimental scale to dry both raw and cooked minced white fish satisfactorily to form lacy, flattened fibres containing between 5 and 10% of moisture when using steam at 40 p.s.i. pressure and rollers 1 ft. in diameter moving at 4½ r.p.m. The process, however, needed careful watching if a uniform product was to be obtained.

Vacuum freeze-dried whole fillets or pieces of raw fish absorbed water fairly rapidly and completely, but texture and flavour suffered considerable alteration and it appeared that the water was held mainly by capillary forces and could easily be squeezed out again or boiled off when fried in hot fat. Vacuum freeze-dried minced, cooked fish was the best product of all, and when reconstituted was practically indistinguishable from the undried mince. There were at the time, however, technical difficulties in the way of large scale development of this process.

The drying of whole fish or fillets in warm moving air was very slow and the re-absorption of water was too slow and incomplete for the product to be comparable with the original fresh fish.

The most practicable and satisfactory product investigated was warm air dried, cooked fish flesh. This could be dried quickly and reconstituted in a form acceptable in secondary dishes such as fish cakes.

Warm air drying

The process finally adopted consisted of cooking the deboned, skinned flesh of fish on perforated trays in steam retorts at 2 p.s.i. pressure for 30 min. or at 6 p.s.i. for 20 min. Allowing the juice exuding to drain away resulted in a more porous product which dried more rapidly and reconstituted better. The cooked fish was minced and spread lightly by hand on wire mesh trays at a loading of 2 lb. per sq. ft., and dried in a stream of warm air.

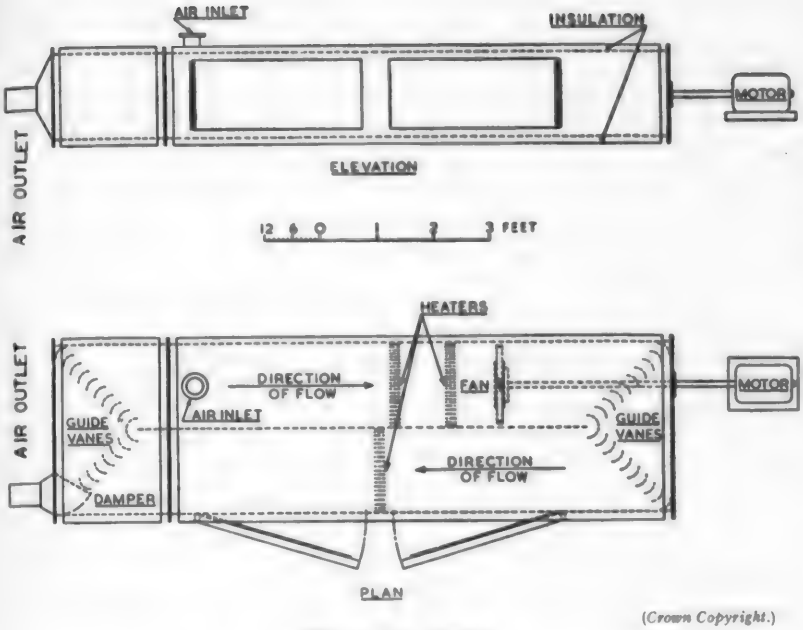
The optimum conditions for drying were determined by a systematic study of the effect of temperature, humidity, velocity, tray loading, fat content, etc. The maximum air temperature that could be tolerated without scorching was found to be about 79°C. (175°F.) for the first hour, during which a wet bulb temperature of not lower than 49°C. (120°F.) was maintained. This relatively high wet bulb temperature was necessary so that the bacterial count in the final product could be suitably controlled. As the product dried, the dry bulb temperature was lowered by stages to 71°C. (160°F.) to avoid scorching. At an air speed of 10 to 15 ft. per second four hours was normally sufficient for drying to a water content of less than 10%.

Types of product

Cod and related species, which are rather lacking in flavour even before drying could be made more attractive by preliminary smoking. The addition of up to 30% of a suitable tasteless fat improved texture and reduced toughening during drying and subsequent storage.

The warm air drying process was successfully applied to almost all of the commoner British species of fish. White fish such as cod and haddock, which contain less than 0·5% of fat, and plaice, with not more than 2 or 3%, yielded products which were generally preferred to those from "fatty" fish, such as herring and mackerel, which yielded a darker product, stronger in flavour. Dehydrated herring and mackerel were also very oily, since the fat content of the undried fish is often higher than the content of protein and other solids and the dried fish could contain more than 50% of fat. The yield was of course correspondingly greater. Although it was thought after earlier trials during the 1914-1918 war that it was practically impossible to dry and store fatty fish satisfactorily, the product made as described above was without noticeable rancidity and could with suitable preparation yield quite a palatable savoury dish.

* Food Investigation Special Report No. 62. *Dehydration of Fish.* H.M.S.O. for D.S.I.R. 160 pp. illustr. 7s. 6d. net.



(Crown Copyright.)

Warm air drying.

The drying tunnel used for small scale experiments to explore the possibilities of drying in heated air was a metal chamber 9 ft. long × 1 ft. 6 in. high × 3 ft. broad, divided by a metal partition into two 1 ft. 6 in. square limbs with suitably designed aerofoils at the corners and a circulating fan at the end of one of the limbs. Heat was supplied by thermostatically controlled electric strip heaters fitted into one limb of the tunnel, the other being used as the drying chamber. The humidity of the air in the chamber was automatically controlled by a wet bulb thermostat operating a magnetic steam valve. The air flow could be varied between 3 and 30 ft. per second. For larger scale experiments, use was made of two sizes of drying kiln originally designed for the controlled smoke-curing of fish. The smaller kiln, which was electrically heated, could hold about 8 cwt. of material; the larger kiln, which was heated by steam coils, held about 1 ton. Air speeds of up to 6 and 15 ft. per second and controlled temperatures of up to 50° and 80°C. (122° and 176°F.) respectively could be maintained in these kilns. The proportions of recirculated and fresh air were also controllable.

Dehydrated smoked herring ("kipper") was also generally preferred because the smoke tended to mask both oiliness and storage changes. Its "life" was therefore somewhat extended.

Although herring and cod, which are our chief and most plentiful species, yielded tolerably good products, more attractive ones could be prepared from more expensive fish, such as plaice, hake or salmon.

Overseas workers, whose wartime results have been reviewed, came to broadly similar conclusions.

Factory data

Large scale laboratory experiments gave promising results and in the summer of 1944 a small factory line was set up by the Ministry of Food to investigate the practicability of the process on a commercial scale. 25 tons of dehydrated herring and kipper were produced in a pilot scale batch truck and tray dryer in 1944. In 1945 another 50 tons were produced in the same plant, as well as several tons of dehydrated cod.

This commercial experiment, although successful, came to an end with the cessation of the war with Japan. There was thus no large scale dehydration of fish at home or abroad comparable with that of dehydrated meat and vegetables. Data and experience were obtained in these pilot scale trials which would be of value in any future reconsideration of the potentialities of dehydrated fish. Specifications for process and product were worked out.

Packaging and storage

Since dehydrated minced, cooked filleted fish contained very little water and was completely edible, it presented considerable transport advantages over fish in other forms. There was between 80 and 90% saving in the weight carried and space occupied compared with the same quantity of canned fish.

Dehydrated white fish consisted almost entirely of protein. Dehydrated fatty fish, of course, had a higher energy value. Under suitable conditions dehydrated fish could be compressed to provide a compact block. A water content of about 12% was necessary to prevent undue pulverisation. This could be achieved by controlling the relative humidity in the dryer at the equilibrium figure corresponding to this water content, which was determined in separate experiments.

When sealed in cans and filled with nitrogen, so that the initial oxygen content of the head space was less than 0·5%, dehydrated fish products could be kept without becoming too unpalatable at tropical temperatures (25° to 37°C. (77° to 99°F.)) for about 6 to 9 months; at ordinary British temperatures (10° to 16°C. (50° to 60°F.) for a year or two; and at freezing temperatures (0° to −10°C. (32° to 14°F.)) for several years. During storage the product ultimately developed an unpleasant odour, and toughened and darkened considerably. The rate of deterioration was increased by raising the temperature of storage, but seemed to be independent of water content, at least between about 2 and 14% on a fat-free basis. At high water contents mould growth developed.

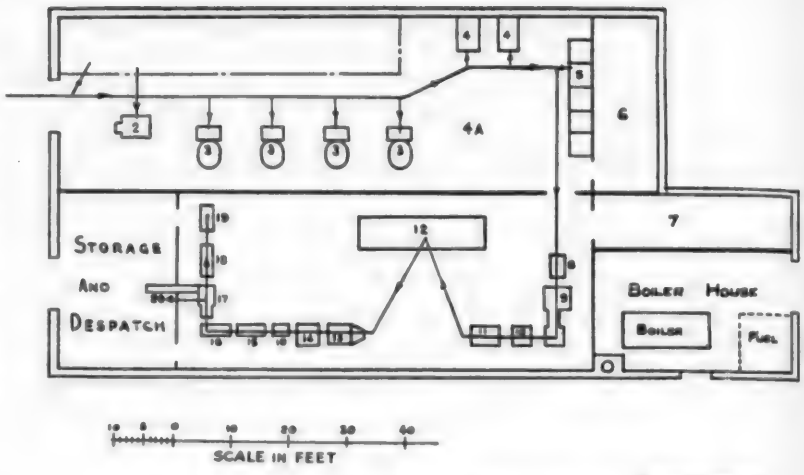
Utilisation

In its dry, granular state, dehydrated fish did not much resemble fish. Texture and flavour were noticeably and irreversibly altered by the drying process and the water re-absorbed during reconstitution was probably held only by capillary forces. However, some fishy flavour was retained and with the process suitably controlled to avoid break-

down of the pieces of dried mince, texture was satisfactory.

Various sorts of consumer tests showed that the products could be used successfully in the home, in works' canteens and in the catering departments of the armed forces. The general conclusion was that this form of dehydrated fish, although not very attractive could on account of its convenience be acceptable in an emergency.

A particularly favourable reception has been given in colonial tests to dried minced, cooked whole herring, including viscera.



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Layout of model factory for dehydration of herring.

1. Storage space for boxes of fish.
2. Herring washing machine.
3. Herring boning machine.
4. Cooking retort (steam).
4a. Space for loading trays and trolleys.
5. Cooler.
6. Tray washing room.
7. Store for cans, crates, etc.
8. Cooked fish unloader.
9. Mincer.
10. Balance.
11. Tray spreading.
12. Dryer.
13. Holding bin.
14. Unloading tray.
15. Press.
16. Seamer.
17. Nitrogen charging.
18. Leakage test tank.
19. Re-soldering table.
20. Filled can conveyor.

Bacteriological considerations

Qualitative and quantitative analyses of the floras of iced and smoked fish before and after dehydration showed that (*a*) there was a marked reduction in the number of micro-organisms present, although sterility was never attained; and (*b*) before drying the flora of iced fish consisted mainly of asporogenous rods (*Achromobacter, Flavobacter, Pseudomonas* and *Corynebacteria*) and the flora of smoked fish consisted of *Micrococcus* species. After dehydration, micrococci, some potentially pathogenic, always predominated.

Storage of a variety of dehydrated products at temperatures ranging from −10° to 37°C. (14° to 99°F.) for periods extending to over a year resulted in reductions in the viable bacterial counts only at temperatures above 0°C. (32°F.). There were also qualitative changes in the flora during storage.

The viable counts also fell when the dehydrated products were stored for periods extending to over a year at relative humidities of 50% and above, the fall being quicker the higher the relative humidity. Mould growth usually occurred at the higher relative humidities, the lowest value at which this was observed being 65% after 62 weeks at 20°C. (68°F.), corresponding to a moisture content in the fish of 10%.

Examination of samples of dehydrated fish (herring, kipper, fresh and smoked cod) taken daily during the small scale pilot plant commercial production showed that the counts could be kept within a fixed arbitrary limit of 10^4 per g. Although potential food-poisoning pathogens (coagulase positive staphylococci) were isolated during the first year's run, the danger from this source is not considered serious provided all operations are properly supervised.

Analysis of the whole process on both the factory and laboratory scales showed that the bacterial load could increase almost up to the values for the raw fish during the mincing and spreading on trays after retort cooking and that, while drying again reduced the count, a sterile product was never attained. The main danger of infection by food-poisoning pathogens, particularly by staphylococci, from human handling occurred at the mincing and spreading stages.

Cost of production

The cost of production is determined principally by the cost of the raw material. During commercial scale tests in 1944 and 1945, the average ratio of input to output for herring was about 5·5. For cod it was about 16. In Britain, herring cost at that time between 3d. per lb. for "freshing" and 1d. for meal and oil, whilst cod varied between 2d. and 6d., depending on quality and market conditions.

The actual processing costs for dehydrating herring amounted to a little less than 1s. per lb. of product, of which labour amounted to 2½d., tins and crates 3d., steam, power and water only ½d., and depreciation 1d. Dehydrated white fish should be no dearer retail than spray-dried egg and might well be a great deal cheaper. At the other end of the scale, dehydrated whole herring could probably be produced at the minimum raw material cost for 1s. to 1s. 6d. per lb. This product is worth consideration for low price markets.

A thermally more efficient process would not cheapen the product appreciably and even an inferior product would still need expensive packing if oxidation is to be prevented. Mechanisation would result in considerable economies in the labour required in the large scale production of dehydrated fish.

Conclusion

The form of the dehydrated products and their limited storage life, especially at sub-tropical and tropical temperatures, are considerable disadvantages. The products, moreover, can only be reconstituted as minced fish. This limits their use to the preparation of "made up" dishes, such as fish cakes, fish pies, kedgerees, savouries, etc. Consumers normally prefer fish to be served whole or as fillets, steaks, cutlets, etc.

It must be admitted that the process of warm air drying at atmospheric pressure results in a noticeable loss of palatability which does not occur in vacuum freeze-drying, a method which has not yet been developed beyond the laboratory stage. For these reasons dehydrated fish must still be regarded as considerably inferior to canned fish.

Radical improvements in the quality of dehydrated fish in all its important aspects, flavour, colour, and texture, along with extended storage life, depend upon further basic investigations that it was not possible to carry out during the 1939-1945 war. Studies need to be made of the mechanism of the migration of moisture in fish flesh, of the heat and water transfer between fish and air, and of the laws that govern the evaporation of water during the drying process. There are also problems connected with the coagulation of the proteins and the scorching of the flesh during drying and with darkening, flavour changes and toughening that occur during storage; solutions to these may follow from increased knowledge of the chemistry of water-soluble and volatile constituents of fish muscle and of the physical chemistry of its proteins and protein complexes. The application of the results of such researches may eventually succeed in putting dehydration on a par with canning as a process that must be seriously reckoned with in the preservation of fish.

In the event of a renewed interest in establishing the production of dehydrated fish on a large scale, supplies of raw material should present no difficulty. Herring are plentiful locally at certain seasons and much more could be landed if there were suitable outlets. Edible, unsold white fish, especially of the cheaper varieties, is also available from time to time.

Although first quality fish is desirable for dehydration, the process is such that proper bacteriological control can ensure that a product made from poorer quality fish yields a satisfactory product of a grade which might find a market overseas. Small scale tests soon after the war have indicated that dehydrated whole herring, the cheapest of the herring products made, would be acceptable in a number of tropical countries.

Products would, however, require to be very low priced to succeed in such markets. As already noted, the raw material element is preponderant and clearly herring would have to be available at prices of the order of those ruling, for example, in the case of fish meal and oil production, which is to some extent subsidised.

A Sceptical View of "Cold" Sterilisation

"For how long will heat continue to be the lethal agent in commercial food sterilisation?" asks C. Olin Ball in a recent issue of *Food Technology*. His conclusion is that heat will continue indefinitely to be the most effective means of sterilising foods regardless of future developments in irradiation.

Heat treatment is liable to produce an undesirable flavour of caramelisation, but the effect of irradiation sterilisation of food is to produce characteristics that elude description beyond the point of saying that the flavours created are distasteful and are moreover associated with drastic changes in molecular structure.

As in the case of heat sterilisation, undesirable flavour changes of ionising radiations vary directly with the intensity of the dose and the length of time during which it is applied. The most promising line of investigation to take therefore, is that which proved effective in heat sterilisation, *i.e.* high temperature sterilisation for a short period—in the case of ionising radiations this would mean increasing the dose intensity and reducing the time.

If this is uneconomic for any reason, the chances for success of ionising ray sterilisation appear slim. A dose of from 10 to 20 million rep is said to be required to inactivate enzymes, but even a dose of half a million rep produces organoleptic deterioration when applied in the range of intensity used in investigations at present. If the enzymes are inactivated by heat, perhaps sterilisation by radiation can be accomplished with a dosage of 3 million rep. But if heat is to be applied, why not increase its intensity to destroy the bacteria as well and finish everything in one operation?

In the light of present knowledge about the perishability of foods in storage it seems purely naïve to believe that food sterilised by "cold" ray treatment would not require cold storage to preserve its quality. Considering that in almost 15 years of intensive research work, no recognisable progress has been made toward preventing serious degradation of organoleptic quality by irradiation sterilisation, it would seem that another 15 years would be a fair estimate of the time in which appreciable progress could be made. Even so, these products would still have to be stored under refrigeration to preserve their quality and some would still have to be cooked before they could be eaten.

Continuous flour production is described in a recent issue of *The Brook*, published by Brook Motors Ltd. An illustrated article describes the day and night working of Heygate and Sons' flour mill. The key unit in maintaining production at this mill is a centralised control panel designed by Brook Motors control gear dept.

Food Manufacturers Should be More Scientific

Sir Frank Engledow's Advice After Nine Years as President of B.F.M.I.R.A.

Food manufacturers were urged to become more scientific in their approach to their job by the retiring President of the British Food Manufacturing Industries Research Association, Sir Frank Engledow, F.R.S. Taking leave of the Association after his nine years as President, he surveyed the present position of the food industry and stressed the increasing importance of a strong research association.

FOOD manufacture has always been subject to a few natural influences, and future problems and prospects for the industry will depend upon its responses to these, said Sir Frank Engledow in his valedictory address to the B.F.M.I.R.A.

The first of these influences is "seasonality" in agriculture and the struggle by modern man to "fight" against it, raising as much agricultural produce in winter as in summer. Big improvements and new developments of storage and processing will have to be devised to keep pace with science and invention in this respect. The second influence is the continuing concentration of population into vast sedentary groups, and wholly new methods for the processing, transport and storage of food must be sought to keep pace with this trend.

Science and the food factory

Sir Frank continued: Does not food manufacture in the main "look to science to solve its problems"? And are not great changes required in this attitude, namely:

> Much more thorough, concerted, study to set out the problems of manufacture so that their fundamentals can be made plain to the scientist.
>
> Initiative in examining the advances of the pure sciences, in their astonishing number and scope, with intent to see what wholly new possibilities they offer for food manufacture?

In some industries, like chemical manufacture, oil and steel, these two desiderata are eagerly recognised and provided for. But it may be said that these are very large industries, while in food manufacture, though there are large firms, each self-sufficient in research and development, there are a comparatively small number of medium size units and a very large number of small or even very small firms. That is true and highly significant as well, and the Research Association's experience points significantly to the interesting parallel in this matter between food manufacture and agriculture (which has an even higher proportion of very small units).

Agriculture has a tripartite scheme for finding out the major practical problems and applying science to their solution. There is an Agricultural Improvement Council with representatives of all branches of agriculture and horticulture, and this is constantly in touch with the National Agricultural Advisory Service, whose officers, always moving among farmers, bring practical problems to its notice. Now the "Panels" of our Research Association play a corresponding part and they perform a valuable service. Can they, however, hope to expose the problems of small firms unless brought into contact with them by an Advisory Service?

The second part of the scheme in agriculture is the Agricultural Research Council and its numerous highly equipped research stations. They are informed about practical problems by the Agricultural Improvement Council, and are also constantly on the watch in every branch of pure science for the possibilities of new developments through fresh advances in pure science itself. There is a Joint Committee of the two councils. Our Research Association and the Leatherhead Laboratories, together with the Food Investigation Organisation (D.S.I.R.) play a corresponding part, but for various reasons—reasons you should ponder closely—have not become as effective as the Agricultural Research Council.

Then in agriculture there is the National Agricultural Advisory Service: one of its functions has already been described; the other is to encourage all farmers, large and small, to use the best existing methods and, without delay, to apply any fresh scientific or technical improvement or development on their farms. Our council is well aware of the need for an Advisory Service in food manufacture, and the formation of such a unit has recently been announced. The future prosperity of the industry will turn largely on its success.

Modern food habits

Now for the last of the primary influences which have governed development of food manufacture and will continue to—namely, public taste and predilection in the matter of food—or, if you like, "food habits." This is a fascinating question. Trends in food habit are not fortuitous or fanciful or the effect of advertising, or even mainly of relative price. Consider some of the basic causes of change:

Nutritional science has its influence on people's eating habits. Among some there is a strong tendency to eat what is believed to be "good for health" or to make the children eat it. Milk is the great instance of this. But opinion in medical and nutritional science

changes as discovery advances—it may sometimes be felt to change rather precipitately—and people's views about what to eat are thereby influenced. Obviously it is necessary for both food producer and food manufacturer to keep abreast of nutritional science, and to enable our industry to do this is one of the great responsibilities of the research association. In the particular aspect of food manufacture requiring biological test of materials there seems to be a great need and great possibilities for a special development under the research association.

Taste, however, is mostly governed by the great rule of eating what you fancy—enough of it and not too much. "Fancy" in this context is not a fickle choice but must be rendered as "physiological liking." Now physiological liking in all advanced countries, especially our own, is obviously in rapid change, the reason being that our habits of life are in rapid change. There are many examples of this, and both food manufacturers and farmers ought to ponder them deeply.

One example of the change is that physical exertion for all classes of the population is now far less than even 20 and considerably less than even 10 years ago. Mechanical power moves us about and does our work, legs and arms alike being spared: heavy manual work has disappeared from most industry.

Less animal fat wanted

It is presumably because of this that animal fat has become not only less desired in the diet than formerly, but in some areas and for some commodities, for example beef, strongly abhorred. Surplus of animal fat is said to be an economic embarrassment in the U.S., where they are feeding it back to pigs and cows, this surplus position having been considerably strengthened by the widespread use of vegetable oils for cooking and for detergents. Better disposal of animal fat may be taken as a good example of the problems arising for food producers and food manufacturers from trends in the public taste.

Trends in backward countries—middle Europe, Asia, Africa—should also be watched. Milk illustrates the situation. For natural reasons milk is very difficult to produce in the tropics, especially the wet tropics. Export from temperate climates of dehydrated butter-fat and of the other milk solids for reconstitution as "liquid milk" may make an important contribution to tropical dietaries.

The machine age has now developed sufficiently to make it understandable for men to say: "Let the machine do the work and I will look after the machine." For the later stages of automation we must no doubt wait awhile. The result must be that in factories, and increasingly on farms, customary processes will have to be so altered that manual work, even light effort, is unnecessary.

Food and automation

The startling prospect must be faced that the things we eat or wear or use will have to be only those which can be machine made. There is no class of things in which this would matter more than in foodstuffs. Obviously there will have to be a lot of work, study and encouragement of mechanical invention. Who will do this for the food manufacturing industries? Farmers in all progressive countries are not merely "leaving it to the engineering firms," but are trying to help themselves not only by the initiative of the individual but, in some cases, by concerted action.

The modern housewife having the same view as her husband is, in effect, demanding to be entirely freed from the "drudgery of the kitchen." Familiar developments like canning and bottling are likely to be much more extensively used. The trimming and washing of vegetables before they leave the farm, grated suet, meat boned and fat-trimmed, and the many kinds of prepared and pre-cooked foods, have made a beginning, but by no means represent the full development of this ending of kitchen drudgery.

Fish and chips, ice-cream and other staple manufactured foods will need both improvements and other things to accompany them if they are not to pall as the standard of living of the generality of the population rises.

How should the food manufacturing industry proceed in these new developments? It cannot go on relying on the occasional new idea, but must explore systematically and ambitiously. Now the possibilities of food manufacture depend ultimately on the physical and chemical properties of the many categories of food substances. It is therefore only by a steadily growing knowledge of these that it will be possible to exploit all possibilities.

Three aims of research

"Man has always lived in a changing world," Sir Frank continued, "but perhaps our world is about as fast-changing as any generation has known." The food industry should beware of the danger of waiting for the "creative" sciences and industries to hand over their discoveries and developments. "They will not and cannot go far out of their way for food manufacture," said Sir Frank in his concluding remarks, "unless we can tell them what we want and give them initial ideas for improvements and for wholly new developments. That we cannot do without a virile research association and an advisory service closely linked with it. . . . Effective research must do three things: first, to make sure of using the best existing knowledge; next, to keep abreast of progress in all relevant branches of science in order to get new *ideas*; thirdly, to single out the true basic problems and keep on attacking them. It needs a very strong organisation to do these three things, and in taking farewell of the food manufacturing industry I can wish them nothing better than that their Research Association may thrive. But it will not thrive without greater effort."

Food Topics in the United States

THIS year's gathering of the Institute of Food Technologists in America—the 16th annual meeting—took place in St. Louis, Missouri, and lasted from June 10 to 14. As is customary the most important of the research projects undertaken by the nation's food processing laboratories were discussed.

Membership of the I.F.T. now stands at 4,500 and spans every segment of the vast American food manufacturing industry—suppliers and related fields. And as this year's president, L. E. Clifcorn, of the American Can Co. pointed out, "our profession influences the daily food supply of every American family . . . and our well-integrated system of food production, processing, packaging, and distribution, well founded in research . . . has influenced food technology throughout the world."

Machinery

Inevitably, much was discussed of direct importance to food manufacturing interests in the United Kingdom, and, inevitably again, the subject of automation came up for consideration—a paper presented by Karl W. Moseley of the W. M. Sprinkman Corporation. He made the important point that automation does not solely apply, nor by necessity become paramount, only in large production problems. In food manufacturing especially, effectively engineered, practically applied and combined with equipment of proper design, automation may no longer be classified as a luxury. Rather, it should be regarded as a means to attain economically a repetitive quality of product to meet specific conditions set up by improved techniques developed in research divisions and laboratories.

The type of application he had in mind was very aptly described in a report tabled by R. A. Minard of Brookfield Engineering Laboratories Inc. It concerned an automatic machine for the continuous mixing of solids and liquids to the right quantity and correct viscosity.

He stressed that as the trend from batch to continuous operation increases, the supply of process material to the line must also be placed on a continuous or automatic basis. The control of this material assumes more importance as it is delivered and used in such situations as a result of the increased rate of usage.

Continuous blending

The blending of solids and liquids, he went on, could now be effected and controlled continuously by a machine that maintained the correct liquid level in a tank, sump, or enrober, while at the same time regulating the viscosity of the liquid. This control, he went on to stress, as well as governing the continuous mixing, was effective and self-compensating for different process loads. Although completely automatic in its operation, the machine has been designed for instant intervention on the part of an operator if circumstances so require. Mr. Minard discussed the machine in its application to the breading of quick-frozen sea food products, but he also indicated the possibilities of its use in other food processing fields.

Tomato juice

A team of research workers at the Western Utilisation Research Branch, United States Department of Agriculture, presented a report on the storage stability of concentrated tomato juice. Juice prepared from whole tomatoes was concentrated to 24% solids at evaporation temperatures of 105°, 150° and 200°F. These concentrates and corresponding single-strength juices were stored for six months at temperatures of 40°, 70°, and 100°F. Other lots were held for longer periods. During storage, samples were periodically analysed for changes in vitamin C, flavour, and visible darkening.

Results showed little or no differences in vitamin C stability, flavour, or darkening between the concentrates and juices stored at 40° and 70°F. At 100°F., only slight differences in vitamin C and flavour were detected, and the first detectable flavour change did not occur in the concentrates until after six month's storage at 100°F., and not until after seven months in the juices.

Vitamin C was lost during storage of concentrates and juices at 100°F., and at the end of six months concentrates showed losses of 50 to 60% of their original content. The juices, on the other hand, showed vitamin C losses of 40 to 45%. The effects of evaporation temperatures on the stability of the vitamin were evident in these experiments. It was most stable in those concentrates evaporated at the lowest temperatures and least stable in those evaporated at the higher.

No darkening or swelled cans were noted in the concentrates during storage at 100°F. for six months, and the first evidence of swells did not occur until more than 19 months at this temperature. Concentrated tomato juice prepared at evaporation temperatures of 150°F. or lower compared favourably in quality and storage stability with canned single-strength juice, and they have been established as being more stable than tomato paste.

Smoked turkey

From the Georgia Experiment Station, came a paper on the smoking of turkeys by three research workers. The aim was to see whether the market for the birds could be extended through this type of preservation method. The outcome of the experiments was positive for the curing and smoking resulted in a distinct product with an attractive appearance and colour, pleasing aroma, firm texture, and delicate smoked flavour.

Results showed that an excel-

(*Turn to page 334*)

Equipment for the Sausage Maker

Mr. P. H. Hilgeland, managing director of Foodtech Ltd., London, recently returned from Hanover, where he visited the International Butchers' and Sausage Manufacturers' Trade Exhibition. Here are his impressions of the equipment exhibited there.

TO DESCRIBE everything I saw would fill many pages. For instance, no fewer than 25 different firms who manufacture choppers were represented. There were choppers from 10 lb. to 9 cwt. capacity. One machine especially caught my eye—a chopper with two double sets of knives manufactured by Universal Kutter Krotz and Co., Stuttgart. Two sets were rotating clockwise, and the other two anti-clockwise. The machine itself had three different speeds, and the bowl itself two different speeds. All buttons on the control panel were fixed on to the lid of the bowl cutter. This chopper has the appearance of a four-engined aircraft, and the noise of the motor when started was just like the noise of an aircraft starting. However, it is my opinion that this machine will be most useful for a very fine and soft mix of frankfurters, etc.

An interesting machine at this exhibition was the E.M.S. rotor chopper manufactured by Edward Muller and Co. of Saarbrucken.

The machine, which was imported into the U.K. for the first time three years ago, has lived up to all that it promised, and has come up to our expectations in the fullest possible sense, especially here in the U.K., where sausage goods contain rusk, flour, etc. The machine is filled with pieces of meat (each up to 10 lb. in weight) and strips of back fat. Then seasonings are added to the meat. Only one revolution is sufficient to give this meat a coarse and clean cut. There is no compression of the meat, and no squeezing. Only 25 sec. are sufficient for a coarse-cut sausage. The whole process of chopping for a normal sausage takes 80 sec. The bowl is insulated; the shaft makes 2,000 r.p.m. when switched on to the fastest speed, and 1,000 r.p.m. at normal speed. This allows a very high percentage of fat to be mixed into the sausage mix, as this fat is not squeezed and, during the cutting process, all fat is cut into small cubes. No grease is produced.

For the first time in my life I saw an inexpensive vacuum sealing machine (manufactured by Rathke and Schulz, Hamburg), which is most suitable for the packing of cooked meats, frankfurters, sausages, etc. I tested this machine personally. I vacuum-sealed frankfurters in "S" casings and kept them in my briefcase (*not* in a refrigerator) for a fortnight. When I opened one of these packs they were as fresh as if they had just been made. I forecast that this machine will be a great help to all sausage manufacturers in the future.

The above photographs, taken by the author at the exhibition, show *Left:* Vacuum sealing machine by Rathke and Schulz, and *Right:* Chopper machine with two double sets of knives by Universal Kutter Krotz and Co.

There was also a model of a sausage meat press, made by Dierks and Sohne of Osnabruck, which was very interesting. This machine is mounted on wheels, and is pushed to the chopper. The meat goes from the chopper into the press and then into the filler. This process is more advantageous during the summer period as the meat balls are air-tight and are placed in the filler in this air-tight condition. This prevents the meat from becoming sour and from losing its colour, which means a saving in labour for the operating staff.

A most interesting machine was the KS "Universal" butchery machine manufactured by Karl Schnell of Winterbach, near Stuttgart. Raw rinds and raw sinews are placed into this machine straight after de-rinding and they are made into a smooth rind paste. The addition of this paste in its uncooked state will give sausage meat a greater binding power.

Sausage meat, seasonings, water and cereals were put into the bowl of this KS machine, and approximately 80 sec. later the sausage meat was ejected automatically. The mixture was then ready for the filler. The sausage meat showed a high degree of emulsification. Approximately 20% of water was added to the meat. The machine was placed in such a position that the ejected meat went straight into the filler.

At this Exhibition a large variety of smoke and cook ovens were shown for the first time, where hams and all sorts of meats can be cooked with the minimum of cooking losses of meat. All types of luncheon sausages, polonies, saveloys and sausages were hung on a trolley and wheeled into the cook oven. These sausages will not break, nor shrink, as these ovens are thermostatically controlled. With this type of oven the sausage maker should make a big reduction in labour costs besides producing a better product. All coppers and tanks will gradually disappear from meat factories in the future, once the excellent qualities of this type of oven are recognised.

A special novelty was shown at a stand exclusively dealing with brine pumps and brining equipment manufactured by Bachert and Sohne, Essen.

For the first time in my experience I saw a brine pumping machine, where the turning of a switch resulted in the exact percentage of salt desired for the pumping process. I made some tests. I set the lever to indicate a strength of 12% salt in the brine. Immediately, a brine thermometer showed that the salt content in the brine produced was 12%. I tried the same for a strength of 18%, and once again the thermometer showed a few seconds later 18%. It will be immediately apparent that this type of brine pump is of great assistance in the brining room, especially when tongues, silver sides, ox-tongues, cooked hams, bacon sides, etc., are pumped with brine.

One other machine is worth mentioning here, where the whole process of the manufacture of sausages was controlled from the chopper. The meat was placed into the chopper, which was fitted with an ejector. This ejector poured the chopped mix into the vacuum ball press, where it was formed into air-tight balls which were fed into a container and rolled over a roller system to the filling machine. This chopper kept three fillers going. As soon as one container was empty, the second full container was rolled to the filler by the roller system and was connected automatically to the filler. This machine is most advantageous for manufacture of hard sausage and allied types, such as salami.

Many other interesting machines were shown at the Fair, but there is not the space available to mention them all. The foregoing are the machines which impressed me most as being the most suitable for the British trade.

Margarine Storage

Experiments were carried out at the German Federal Institute for Food Preservation, Karlsrühe, to ascertain the groups of bacteria present in freshly produced margarine and the best storage conditions from the point of view of microbiological deterioration. According to N. Maltschewsky (*Fette, Seifen, Anstrichmittel*, 1956, **58**, 336) different samples of two well-known brands were stored at temperatures of 20°C., 5°C., −5°C., and −25°C. respectively, and examined at weekly intervals over a period of five to ten weeks. With both groups of samples, the bacterial growth was small and confined to harmless bacteria. In one group, psychrophile germs were found. To prevent the growth of such germs, which might affect the quality of the margarine, it is advisable to keep the margarine at 5°C. during the incubation phase (about 10 days) and then at much lower temperatures, avoiding the range of −5°C. which favours the growth of these bacteria.

Food Topics in the United States

(*Continued from page* 332)

lent product could be obtained by curing in a solution (12 gal. water, 8 lb. cane sugar, 8 lb. salt, and 8 oz. sodium nitrate) at 38°F. for six days; and smoking:

(*a*) Country-style at temperatures 90° to 110°F. for six days;
(*b*) In a locker plant at moderate temperatures 100° to 125°F. for two days; and
(*c*) In a commercial smokehouse at temperatures from 130° to 150°F. for 18 hrs.

Products smoked by any one of the three methods were judged highly acceptable by the taste panel. The white meat of the smoked turkey comes as an attractive pale pink and the dark meat varies from grey to a decidedly deep pink.

Luncheon meat canning

The use of organic reductants in the canning of luncheon meat was described by three technicians attached to the American Can Co., who pointed out that slight brown discolorations sometimes develop in the surface portions of canned pork luncheon meat at areas contiguous to the sideseam or to the "score" of key-opening cans. Several years ago it was discovered by the company's research and development department that the discoloration could be reduced to commercial insignificance if the meat was packed in cans containing small areas of metallic aluminium in the end construction. Recently, various laboratories connected with the meat industry have shown that the use of ascorbic acid as a constituent in the curing salts gives a better cure and increased stability of colour in the ordinary refrigerated distribution of canned meats.

In the investigations described at the annual meeting, it was found that ascorbic acid will also prevent the discoloration specifically encountered with canned meat products.

Growing Popularity of Fruit Juices
International Congress at Stuttgart

By V. L. S. Charley, B.Sc., Ph.D.

(*H. W. Carter and Co. Ltd.*)

"The spirit of fruit juices was abroad in Stuttgart that week," says Dr. Charley of the Fourth International Congress of Fruit Juices. While the exhibition was intended as an international display, it was remarkable for the fine showing of the local fruit juice industry—very large quantities of fruit juices are sold in Germany. Dr. Charley, a well-known personality in the British fruit juice industry, gives his impressions of the lectures, reports and exhibits.

THE Fourth International Congress of Fruit Juices was held in the magnificent surroundings of the Killesberg Exhibition Park at Stuttgart from May 28 to June 2. The conference was promoted by the International Fruit Juice Union, which has its headquarters in Paris, whilst the organisers were the Central Committee of the fruit juice and fruit drink industry of Germany, which is centred at Bonn. Very successful international congresses have previously been held in Paris, Zürich, and Madrid, but special interest was taken in this Congress because, being held in Germany, it was anticipated that the local fruit juice industry would make a very extraordinary show of their products and machinery. This was indeed the case, and, apart altogether from the three plenary meetings for the giving of lectures and the technical conferences, there was a magnificent display of every type of fruit juice and machinery used in the industry.

Firstly, as to the lectures. Only the opening sessions were prefaced by music from an orchestra, but for people who live in those countries where these things are not done with such a sense of occasion as in Germany, it was strange to prepare for one's scientific and technical feast by listening to the choice strains of German and other composers. It was noted, however, that many of the official delegates from abroad preferred machines to music and could be seen discussing the merits of various pressing or filtration systems, whilst in the next building others were intent on Wagner.

Raw materials and quality

The lectures had as their central themes the following topics: "better production, clear characterisation and better selling, live more healthily, advertise more actively." These topics were discussed in detail by a galaxy of speakers from Sweden, Germany, Switzerland, Austria, Spain, France and, be it happily reported, from this country. Some of the papers were very much a rehash of information from previous Conferences. The same old story tends to crop up from conference to conference and from text-book to text-book. This was particularly so with the nutritional story in which medical knowledge tended to get mixed up with nutritional information, and one story presented at Stuttgart differed very slightly from that we met before the war at meetings in Germany and Austria.

One paper deserved to be commented on very favourably. Prof. Koch of the Central Research Station for Fruit and Vegetable Products, Geisenheim, gave a general report on the influence of raw material on the quality of fruit juices. He had been provided with 26 special reports from a very wide range of countries, including Australia, America and Canada, and covering practically all the fruits of any importance. Copies of these sectional reports were available to the delegates and, having read these in some detail, it was obvious that Prof. Koch had made a masterly *exposé* of the whole set. Fruit juice concentration came up for discussion as an important modern technique; it was pleasant to see Dr. Pollard of the Long Ashton Research Station taking a central position in these discussions and to hear the various delegates expressing their appreciation of the valuable work which has been done at Long Ashton in the last few years.

The technical commission

The International Fruit Juice Union organised the technical commission, which owes a great deal of its forcefulness and usefulness to Prof. Georg Börgstrom, the director of the Swedish Institute for Food Research, Göteborg (S.I.K.). Dr. Börgstrom speaks fluently in several languages, but it was a great tribute to the small English delegation for him to choose English for one of the main lectures of the conference on Fruit Juice Production in the World and Trends in Development. Under his inspired leadership the technical commission held a series of three conferences, at which scientific and technical matters were discussed in great detail. It is nothing short of amazing how much ground is covered at these technical meetings. With only a bare smattering of German, one could understand Prof. Deuel of Zürich presenting the most up-to-date story on pectin and pectic enzymes, and the discussions, which were long and involved, were undertaken in several languages which, if they were beyond any of the delegates, could be translated at will by Prof. Börgstrom or the unique Dr. Gachot. Scientifically, it was obvious that the very latest techniques of investigation are being applied to the problems of

producing pure fruit juice, and analytical procedures, in particular, are being overhauled and brought up to date.

Fruit juices on display

The display of products was outstanding because of the many blackcurrant juices on show. It is understood that last year very large quantities of blackcurrant Süssmost were sold in Germany at a price nearly double that of beer, and more than that of an ordinary table wine. The product itself was presumed to contain about 30% of juice with a minimum acidity of 1%. There can be no doubt that the blackcurrant juice product has gripped the imagination of the Germans. It could be seen selling freely in the highest class hotels in Stuttgart; in typical German beer halls in Stuttgart and Munich; in the now famous restaurant at the top of the Stuttgart television tower, where one dines on the most remarkable food 500 ft. above the earth; in cheap restaurants and transport cafés; and big collecting centres for lorries. A whole bevy of lorry drivers were seen to be drinking blackcurrant drinks before getting into their cabins and driving along the interminable miles of the southern German autobahn.

Other products were apple juice (the cheapest in the range), red currants, white and red grape juices, and a very fine cherry juice which was made from Morellos. There were very few blends of the cocktail type, but these 6 or 7 individual juices could be obtained at almost any drinking place in the country. It is a wonderful tribute to the industry which has only recently started to rehabilitate itself after the war. No English product was shown, although it was emphasised in the original literature that it was an international display. This was a grave neglect on the part of the British industry, although it is understood that one firm actively marketing apple juice did enter their product, but the samples were lost *en route*. Surely the next Conference should be assured of a full and catholic display of products from this country.

Natty machines

Lastly, the machinery exhibition showed very clearly what strides had been made in recent years in keeping up to date with the latest developments in machinery production. The exhibition covered both large-scale plant and "household" equipment to be used by a village or school. This latter included some extremely natty pieces of apparatus —the adjective is used advisably.

Laboratory apparatus for a small one-man operation for fruit juice control was a mass of intricate plastic tubes for pulling up solutions into burettes, etc.—all highly coloured and looking a little like a toy shop.

But the fundamental types of large plant such as presses, pasteurisers, filters, and bottling machines were there in profusion, beautifully built and fashioned to look well and perform well.

The spirit of fruit juices

To anyone who conscientiously attended the general lectures, the scientific symposia, and had a look at the fruit juices and the plant, there was very little time for anything else but sleep. However, the spirit of fruit juices was abroad in Stuttgart during that week.

Going up in the lift to the restaurant in the television tower one overheard two Germans discussing pectic enzymes; trying to buy a very thin shirt because of the heatwave in Germany on the third day, one was offered a shirt in a shade which the salesman assured one would blend well with the colours in a fruit juice establishment; and on the 'plane from Zürich late on the Saturday night as one approached London, the question "whatever makes them drink all that stuff when they've got such lovely beer and wine?" was still being actively debated by 5 or 6 gentlemen as their Viscount glided into Heath Row.

It was a good Conference—interesting, inspiring, and intriguing in the possibilities which had opened up for the future.

To the Editor . . .

Complete Fruit Cake Mix

DEAR SIR,—We were very interested to read in the July issue of FOOD MANUFACTURE on p. 302 under the heading of Cake Mix Manufacture, the claim by the Shredded Wheat Co. that their new product—complete fruit cake mix—is the first of its kind (inferring that this product is the first complete fruit cake mix on the British market).

No doubt you, and other cake mix manufacturers, will be more than interested to learn that, to the best of our knowledge, we were the first company to ever produce and market a complete cake mix and complete pudding mix.

In April, 1936, four varieties of complete cake mix (rich fruit, lunch, ginger, madeira), and seven varieties of complete pudding mix (lemon, chocolate, ginger, sultana, rich fruit, date and christmas) were marketed with success. It was only due to the outbreak of war in 1939 and the inability to obtain the necessary raw materials that these lines had to be discontinued.

This valuable experience in this field, and our total manufacturing experience in the incomplete cake mix market, dating from 1884, has enabled us to again successfully market our latest complete mix—namely, *Cakeoma* iced gateau in lemon, orange and strawberry flavours.

H. K. RAVENHILL,
Sales Manager and Director,
LATHAM AND CO., LTD.
Bromborough.

The Bacon Information Council has issued a full colour booklet as part of its educational campaign. It is designed to inform housewives of the versatility of bacon; to show them how, in addition to forming the basis of the main meal, it can be used in many different ways for subsequent made-up dishes.

Bacon is often displayed on store counters without identification. This makes it difficult for the housewife to decide which piece is which. The booklet has a page of coloured illustrations, which will familiarise her with the look of each cut.

Frozen Egg Hygiene in Baking

HYGIENE precautions to be taken with egg products have been drawn up by the British Baking Industries Research Association. Notes on the precautions were prepared for members of the Association when it was reported that *Salmonella paratyphoid B* had been isolated from frozen whole egg and dried hen albumen imported from China, but when outbreaks of paratyphoid fever were associated with Chinese frozen whole egg (*see* FOOD MANUFACTURE, December, 483) it was decided to revise the notes and circulate them more widely.

Most baking operations kill *salmonella* organisms, including paratyphoid bacilli, but the risk of contamination of utensils and equipment, personnel and uncooked foodstuffs remains. Thus, cans of liquid or thawed-out frozen egg containing paratyphoid and other *salmonella* bacilli might serve, for example, in a bakery as a reservoir of infection from which other products, not subsequently baked, may become contaminated.

It is, therefore, essential to take some simple yet effective precautions.

(1) Cans of egg when opened should be kept away from other products (*e.g.* imitation cream). Do not open and thaw more frozen egg than is absolutely necessary. Do not process more dried egg albumen than necessary for the purpose in hand and reconstitute it under as cool conditions as possible.

(2) Avoid spilling liquid egg; cans when opened should not be stood on the work table or emptied into basins or other low-sided containers from which spillage occurs.

(3) All utensils should be thoroughly cleansed by washing in boiling water, and the washing should be so arranged that the washing-up water does not infect other utensils. For those bakeries which have live steam available the use of this would be an added safeguard. (This recommendation also applies to the use of dried egg albumen.)

(4) If possible, separate measures should be reserved for use with liquid egg. They should not be used for measuring any other material unless sterilised as described in (3) above.

(5) Operatives should thoroughly wash their hands and arms before handling finished goods or goods in preparation, in particular those in which cream fillings and the like are being incorporated. (This recommendation also applies to the use of dried egg albumen.)

(6) A Savoy bag should never be handled after using frozen egg, or batters containing frozen egg, until the hands have been thoroughly washed. (This recommendation also applies to the use of dried egg albumen.) Savoy bags should be sterilised frequently and at least once a day. One of the easiest and most reliable methods of achieving this is by boiling the bags in water for ten minutes. Proofed nylon fabric bags with stitched seams and non-proofed white nylon fabric bags with sealed seams both withstand this treatment satisfactorily.

(7) It is strongly recommended that, where possible, separate working space should be set aside for processes involving liquid egg in mixing operations. In any event the preparation of any product or part of a product which is to be sold uncooked or lightly cooked (*e.g.* cream fillings, custards, meringues) should be carefully kept apart from processes involving the use of liquid egg. If duplicate facilities are not available before such preparations, utensils and equipment should be cleansed as in (3) above and operatives' hands and arms carefully washed.

(8) Make quite sure that tins which have contained frozen whole egg are thoroughly washed out and that any residues containing egg are dispersed in such a way that flies cannot alight on them. Flies, clearly, could become contaminated with *salmonella* and pass the infection on.

Even though very shortly it is believed that much of the dried egg albumen commercially available will be heat treated and free from *salmonella* organisms, it would be wise to continue the hygiene precautions specifically mentioned above regarding its use.

It may well be also that heat treatment by pasteurisation of whole egg prior to freezing is the only foreseeable practical method of minimising the risk of *salmonella* infection. It is known this can be done without affecting baking quality provided the initial egg quality is satisfactory. Such a solution cannot, however, be universally rapidly effected and the B.B.I.R.A. has requested every baker's co-operation in following the simple hygiene precautions mentioned above.

Standard for Parchfoil

British Standard 2758 makes provision for the quality of vegetable-parchment and aluminium-foil used in the manufacture of parchfoil for wrapping dairy and other food products, and gives general requirements for protective coatings and adhesives. The specification includes recommendations for minimum thickness of the laminate materials suitable for ordinary requirements.

Parchfoil is a convenient term to describe laminates of vegetable-parchment and aluminium-foil, and its adoption is recommended by the committee.

Copies of this standard may be obtained from the British Standards Institution, 2, Park Street, London, W.1. Price 2s.

Better Grapefruit Products

By Howard Fox

The prospect of bigger imports into Britain of Florida grapefruit and other citrus products adds interest to this description of recent developments in the industry there. The output of canned and quick-frozen grapefruit sections has been increased and new products include concentrated crystals and concentrated frozen juices.

A SHORT while ago a group of citrus industry leaders from Florida visited this country under the sponsorship of the Florida Citrus Mutual organisation. The aim was to see at first hand the prospects for selling more citrus to the United Kingdom, and especially more grapefruit.

The problem of grapefruit disposal is serious in Florida and has been since the U.K. market was virtually closed to give preference to produce from the West Indies and to conserve dollars. However, the latter difficulty vanishes when, from time to time, allocations of dollars are made available for specific consignments. Thus, last December, something like $500,000 worth of citrus products were allowed to enter the U.K. and more recently 3·75 million were allocated for fresh American citrus.

Under a new agreement $1.5 million worth of Florida citrus products will enter this country during the three months to September 30. Because the agreement has been concluded under the terms of the Mutual Security Act the expenditure does not involve loss of dollars to Britain.

One million dollars of the total amount will be spent on canned grapefruit sections while the remainder will cover hot pack orange juice concentrate for the child welfare scheme.

The agreement represents the first instalment of the 1956-57 import programme of citrus from Florida. Last year's total figure was $5.5 million, and there are grounds for expecting that it will be greater this year.

Peeled grapefruit on the way to sectionising at the plant of Holly Hill Fruit Products Inc., Florida. This firm is now successfully producing quick frozen grapefruit sections.

Frozen citrus juices

Three developments have taken place in the U.S. during the past two years and the results can now be seen in the food stores and processing plants. The range of concentrated quick frozen juices has been greatly enlarged from the original orange product which still, however, dominates the market. It has been found, for example, that grapefruit, tangerine, and lime concentrates can be prepared with only slight modifications of the methods used for orange.

Research at the Citrus Products Station, Winter Haven, Florida, and the Fruit and Vegetable Laboratory at Weslaco, Texas, has established that concentrated grapefruit juice, while showing a marked tendency to clarify and form gels, responds to preliminary heat treatment for the inactivation of the responsible enzyme, pectinesterase. Grapefruit concentrate of a pink colour can be made from coloured varieties by using cutback juice rich in comminuted naturally coloured pulp.

Frozen tangerine concentrates show little tendency to clarify or gel, but the small fragile fruit handles with some difficulty if regular orange juice extracting equipment is used.

On the other hand, quick frozen lime juice products differ from grapefruit and tangerine concentrates in that they must be diluted to less than single strength for use. Prepared limeade as now processed contains the equivalent of about one part fresh lime juice to six parts of water. The frozen, sweetened limeade product which is already popular in the U.S. is composed of single strength juice sweetened to about 45° Brix which is then diluted to approximately 4·5 vol. A sweetened concentrate is made into limeade by

the dilution with water to 8 vol. and an unsweetened concentrate is made into 35 times its volume of limeade by adding sugar and water.

Frozen grapefruit sections

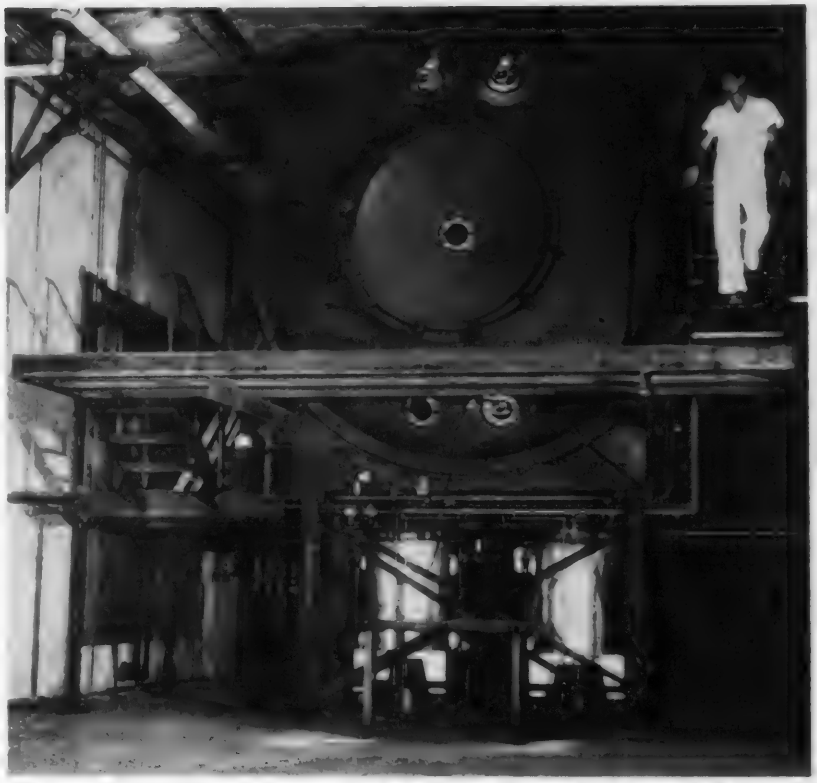
A product which has become very much in demand wherever it has been introduced into U.S. markets (and which may well be seen over here before long) is the quick frozen grapefruit section. The pioneering company in this particular field is the Holly Hill Fruit Products Co. of Davenport, Florida, and they plan to pack 100,000 cases of the sections this season. This company will handle more than the entire citrus industry of the U.S. last year.

Medium-sized fruit (70's and large 80's) is selected and the sectionising was originally carried out by the accepted method—delaying freezing after canning in order to ensure sugar penetration in the fruit. It was discovered, however, that later freezing drew the juice from the grapefruit and diluted the syrup. Research in processing equipment gave rise to special machinery that would subject the can to a 27-in. vacuum, expel the air, and drive the syrup directly into the section. At that stage the fruit was frozen without delay—the entire process taking less than 2 min. Loss of juice was thus ended.

Fruit is sized upon entering the factory and mechanically peeled to remove the outer membrane. A conveyor belt carries it to women who cut and place the segments into the can. If passed by an inspector, it then goes to the pre-vacuumising syruper and on to the freezer tunnel. After 26 min. in the tunnel the cans emerge with an internal temperature of −20°F. They are then cased and transferred to cold storage rooms prior to shipment in refrigerated lorries or railway wagons.

Concentrated citrus crystals

The third development in Florida grapefruit processing is the successful production of concentrated crystals by Orange Crystals Inc., of Plant City, Florida. A subsidiary firm of the Vacu-Dry Company of California, these people are now marketing in the U.S. and for export orange and grapefruit crystals which are 2·5 times lighter in weight than quick frozen concentrate, 8·5 times lighter than whole canned juice, require no constant agitation at the reconstitution stage, will withstand 100°F. heat for months at a time and preserve 96% of the vitamin C content intact.



The huge dehydrator-concentrator at the instant orange and grapefruit crystals production plant of Orange Crystals Inc., Plant City, Florida.

The secret lies in a continuous dehydrating of fresh juice which is carefully controlled both as to short applications of heat and for a limited time in a high vacuum. The water is almost entirely removed and there is no problem of oxidation, taste impairment, or of storage life.

During the prolonged experimental work which led to the successful processing formula, it was established that in drying citrus juices by any method—whether into frozen concentrate or crystals—some essential flavours and oils were subtracted. So that these should be restored when the product was reconstituted, an additional technique was worked out by the Vacu-Dry Co. whereby they were trapped in a solid medium which was then granulated. The powdered absorbent was added to the citrus crystals in the proportion of 1% of total volume and when mixed with tap water these natural flavour and essential oils are released.

For years the Vacu-Dry Co. of California has been supplying the American Armed Forces, institutions, and the retail market in the U.S. with dehydrated deciduous fruits dried to a moisture content of 1 to 2% and it is thought that this new crystal product will be an enormous help to the Florida citrus industry both as to oranges and grapefruit. The big vacuum dryer now in use at Plant City, Florida, was built to the Vacu-Dry Co.'s specifications.

Citrus production in Florida is increasing by some 9% each year. Two-thirds of the orange crop goes to canneries—and more than two-thirds of that finds its way to the quick frozen concentrate departments.

British Food Technology

THERE are few comprehensive publications on British food technology. Although an attempt is made to increase this number by the publication of a new book,* comprehensive is hardly an apt description of the contents.

The book is divided into two parts, the first dealing with methods of processing sugar, sugar confectionery, chocolate, jam, fats and margarine, flour, bread, biscuits, fruit and vegetable canning, refrigeration and dehydration. The other part details laboratory control methods for some of these items and others such as bakery materials, milk and meat products.

Although the claim is made on the dust cover that the information is detailed, this is not substantiated by a careful reading of the contents.

The chapters on flour milling, sugar refining and canning are praiseworthy and will be useful to technologists in these fields. The complete book is a guide to certain aspects of food technology methods in this country and it should serve as an interesting foundation to the student. Practising food chemists require more detailed and selective data on the topics chosen for inclusion.

The statement, "Lecithin . . . is used in chocolate to save fat" on p. 27 is not borne out by the fact that this product is used at a level of up to 0·3% in chocolate.

The author of the section on jam manufacture considers that a good gel is only obtained when the *p*H lies between 3 and 3·2. He further states, ". . . there shall be not more than 40 p.p.m. of SO_2 in the finished jam." In fact, the statutory maximum of 100 p.p.m. was introduced over two years ago.

In chapter six it would perhaps have been correct to have stated that boric acid was allowed as a preservative in margarine up to the end of fat rationing and it would be interesting to have the available evidence for the apparent regional preferences for margarine of different colours.

The section concerning flour milling should have noted the anticipated discontinuation of nitrogen trichloride (agene) treatment of flour, which is now a fact.

The laboratory control methods are somewhat sketchy in content and presentation. For example, methods of determining fruit content, fat content and essential oil content of jams, fruit curds and mincemeat are omitted from the jam control section. The use of the flame photometer in modern investigational techniques might have been described, if only briefly.

Regarding laboratory methods for meat products, it is disturbing to find 13 pages devoted to the analysis of meat extract and only two pages each to meat pastes and corned beef. Surely other meat products such as sausages and canned meats deserve some mention?

Thirty-six misprints were noted in the complete book and it is to be hoped that these will be eliminated in a second edition.

JAMES D. DEVEY.

* *Food Technology, Processing and Laboratory Control.* Advisory Editor: F. Aylward. Pp. viii+303. Newnes, London, 1955. 21s. net.

Sugar Analysis

IT is a commonplace of the century that the world is becoming more complicated as it becomes smaller, and that every year our lives are governed if not more surely at least more rapidly by what happens in Peru or Puerto Rico. As a sort of defence mechanism against this trend there has arisen the international standardising body whose aim is to introduce uniformity—or, failing that, at least a highest common factor—into the too-many-splendoured processes of our industrial activities. Of such bodies ICUMSA—the International Commission for Uniform Methods of Sugar Analysis—was one of the earliest, and nearly sixty years of patient approach to common understanding lies between the first meeting in 1897 and the publication of this report* of the proceedings of the eleventh session.

On the work of the Commission itself it would be presumptuous of your reviewer to comment. Within its restricted field the report is both a truly monumental record of the efforts of specialists whose names are known throughout the world and a storehouse of original information which most certainly could not be found elsewhere collected together in one place. Misprints are few and for the most part innocuous, although on p. 108 the qualification "(inorganic and organic)" appears against both phosphate and silicate anions in a table of non-sucrose components of sugar products, which is probably not what is meant. One or two other words, such as "inspirator" (of a man) and "separatory" (of a funnel) are witness to dictionary translation.

But who, one reflects, is to standardise the standardisers? With nearly half the delegates on the Commission coming from this country, a certain sturdy British independence in the matter of dimensions is understandable; but surely the description of an apparatus as consisting of a cylinder 45 to 50 millimeters in diameter to be filled with a funnel having an orifice situated one inch above the cylinder and one centimetre in width is carrying a national characteristic too far. Similarly on p. 24 600°C., is equated to 1112°F., on p. 26 to 1110°F., and elsewhere rather more realistically to 1100°F. If the chemist reading the method must use the Fahrenheit scale and is considered incapable of the arithmetic involved, would not "about 1100°F." be a fair compromise on each occasion?

Such details apart, this report is what its predecessors have always been—something the sugar chemist whose work brings him into contact with the products or procedure of other countries must possess.

C. F. M. FRYD.

* *International Commission for Uniform Methods of Sugar Analysis.* Pp. 113 inc. index. 20s. net.

Advances in Food Technology

FRUIT CANNING

Research on Apricots

To ensure germ destruction, canned apricot halves must be heat-treated. A fairly high failure percentage experienced in the Moroccan apricot canning industry led to research at the Technological Laboratory of the "Institut des Fruits et Agrumes Coloniaux" in Morocco. When dealing with ripe fruits, it is necessary to take certain precautions to avoid changes to the texture of the fruits. In particular, it is necessary to avoid heat shocks, and to heat the fruits progressively during the juice production, open-can preheating, and sealed-can sterilisation stages. The requisite heat (about 80°C.) must be maintained for at least 10 sec. before the sealed cans are cooled in cold water. Higher temperatures may be applied to fruits which are not fully ripened.—A. Patron, *Fruits*, 1956, **11**, 153.

CURED MEAT

Chemistry of Colour Fading

In the presence of visible light and air or air alone, at least part of the nitric oxide of purified heat denatured globin nitric oxide myohaemochrome is further oxidised to give the nitrite and nitrate ions.

Nitric oxide from the pigment of cured meat can be lost as a gas, possibly in the form of nitric oxide or possibly in the form of nitrogen dioxide. A gas which is adsorbable by potassium hydroxide solutions and which is probably CO_2, is produced in the oxidation of the haemichrome in the air and in the presence of high intensity visible light.

Oxygen adsorption is associated with both processes involving loss of nitric oxide from the pigment and the oxidation of the resulting haemichrome.

Several possible pathways have been suggested for the nitric oxide lost from denatured globin myohaemochrome which could be of practical significance to the problem of cured meat discoloration.

Denatured globin haemichrome shaken in the presence of free fatty acids undergoes a darkening not observed in the light. Oxidation of the haemichrome may possibly be of significance in cured meat colour deterioration.—H. N. Draudt and F. E. Deatherage. *Food Res.*, 1956, **21**, 2, 122.

MEAT PRODUCTS

Tropical Packaging

The German Federal Meat Research Institute has carried out systematic tests of meat packaging materials suitable for tropical conditions. So far, the tests have been confined to dry sausage. It was found that coating materials are of value only if they have a good adhesion, elasticity and mechanical strength. Loose wrappings may be harmful inasmuch as they are liable to retain moisture. Filling materials are needed to act as cushions between the individual pieces and against mechanical impact from outside; such materials must be free from taste and odour; they must not absorb moisture nor contaminate the goods. Buckwheat roughs are regarded as suitable for this purpose. External wrappings might consist of solid wooden or cardboard boxes, with well secured air holes if necessary. Tinplate lining is not regarded as suitable for this purpose. In principle, an airy type of packing, avoiding any accumulation of heat or moisture, is to be preferred to hermetically sealed packings, with the exception of sealed vacuum cans. Suitably packed meat products can endure a long sea voyage under tropical conditions without deterioration.—G. Dutschke, *Die Fleischwirtschaft*, 1955, **7**, 585.

VEGETABLE OILS

Cotton Seed Cake

The residual cake left after the expression of oil from cotton seed has a potentially high nutrient value and is used as cattle fodder, but as it contains toxic substances, it is not fit for human consumption. The technical detoxication process is based on treatment with humid heat, but this treatment has an unfavourable effect on the digestibility of the proteins. Such an effect can be avoided by a different treatment based on the use of polar solvents which yield cotton seed meal which is completely non-toxic, digestible, and colourless. This treatment, however, is too expensive to permit the large-scale use of cotton seed cake for human consumption, even in those cotton growing countries, where a deficiency of proteins is experienced.—E. L. Delvaux, *Fette, Seifen, Anstrichmittel*, 1956, **58**, 348.

FISH

Canning Eels

Young eels or elvers caught when migrating from the sea into the rivers are a nutritive food, rich in fat. When used for canning, there is no need to behead or eviscerate them; they should be absolutely fresh and processed as fast as possible.

The eels should be washed with fresh water in tanks made for this purpose or in the boxes used for their shipment and treated for 10 min. in a weak brine aromatised and slightly acidified with vinegar at a rate of 1 l. per 15 l. of water. The vinegar may be replaced by citric acid crystals (93 g./15 l. or $\frac{13}{16}$ oz./gal.). For the cooking operation, the eels are spread on grids submerged in stainless steel cooking tanks. Stainless steel avoids blackening the fish. Once the product is cooked, foreign matter,

such as shrimps and seaweeds, are eliminated. Proper draining is important when the fish are packed in oil. After the product has lost an adequate amount of water, it is placed in ⅛ or ¼ (170 or 212 ml.; $5\frac{7}{8}$ or $7\frac{5}{8}$ fl. oz.) cans. To avoid blackening the product, the inside of the containers should be lined with sulphur-resistant paper or enamel. The cans have to be sufficiently filled with at least 65% of meat by weight, or 60% of the capacity by volume, *i.e.*, the cans should have 120 or 150 g. ($4\frac{1}{4}$ to $5\frac{5}{16}$ oz.) of fish, respectively. Olive oils, peanut oil or any other kind of edible oil may be used, but they can also be replaced by a weak brine or any other sauce. Closing and processing should be done at 115°C. (240°F.), the processing time depending on the container and the liquid added.—*FAO World Fisheries Abstracts*, 1956, Jan./Feb., 41.

CAKES

Sorbic Acid as a Fungistat

Sorbic acid is superior to calcium or sodium propionate or to sodium benzoate in protecting cakes against mould spoilage. It is approximately four times as effective as the propionate, *i.e.* one part of sorbic acid is as effective as about four parts of propionate when the latter is used at a high enough concentration to exhibit measurable fungistatic activity. When used at the same concentration of 0·20% (expressed on the batter weight basis), the extension of mould-free life of the cakes with added sorbic acid is about four times that of the cakes made with added propionate. Whereas the fungistatic activity of sorbic acid is increased with a lowering of the *p*H of the cake, the superiority of sorbic acid over the propionate is not due simply to differences in *p*H between cakes made with the fungistatic agents; sorbic acid is inherently four times as effective as propionic acid in protecting cakes against mould spoilage. The quantitative fungistatic superiority of sorbic acid over propionate established in laboratory studies has also been confirmed by tests conducted on cakes baked, sliced and wrapped on a commercial scale.

Propionates can be used at only limited concentrations without imparting a flavour to the cakes. This restricts its use level to such low concentrations that the fungistasis attained is much less than desired. With sorbic acid used at the 0·1% level (expressed on a batter weight basis), a significantly greater degree of protection against mould spoilage is now obtained without alteration of cake flavour. There would seem to be little reason to increase sorbic acid concentration in cakes above the 0·20% level. There is no objection on the part of the U.S. Food and Drug Administration to the use of sorbic acid in concentrations up to 0·30% in place of propionates in cakes.

No measurable loss of sorbic acid occurs during cake manufacture.—D. Melnick, H. W. Vahlteich and A. Hackett. *Food Res.*, 1956, **21**, 1, 133.

MEAT

Rapid Cooling

In a new rapid-cooling installation at Munich abattoir, pork carcasses of medium weight are cooled down within 12 to 13 hr., and beef carcasses within 20 to 24 hr., to a temperature of 3° or 4°C. in the core of the muscle. Weight losses with pork are of the order of 1·5%. During the winter months the installation is used for thawing imported meat.—Dennler, *Die Fleischwirtschaft*, 1956, **8**, 320.

SPICES

Antioxidant properties

Studies on the antioxidant effectiveness of spices in foods have shown that this depends largely on the type of substrate in which they are used. In general they are more effective in a simple fat-water emulsion system than in baked pie crust.

In a recent study, 17 spices, selected on the basis of their antioxidant effects in lard, baked pie crusts and fat emulsions in water, were studied in ground pork and mayonnaise. Only 6 of them were found to have antioxidant properties in all the substrates. Four of the spices were further studied and found to be effective in a second mayonnaise formulation and in a French dressing. It was found that allspice, cloves, sage, oregano, rosemary and thyme increased the stability of all the fat substrates in which they were tested, but their relative effectiveness varied with the different types. Cloves were a powerful antioxidant in simple oil-water emulsions and in ground pork, while oregano was most effective in mayonnaise and French dressing. Sage and rosemary had previously been found to be much more effective than other spices in lard alone.—J. R. Chipault, G. R. Mizuno and W. O. Lundberg, *Food Tech.*, 1956, **10**, 5, 209.

FISH LIVER OILS

Vitamin A Instability

Several fish liver oils produced in British Columbia have shown severe losses of vitamin A potency and experiments have been made to determine if iron contamination causes instability of oils and on the ability of butylated hydroxyanisole to prevent the destruction of vitamin A.

The experiments showed that rust-free equipment is essential and the use of an iron-binding agent is indicated. The processing must be completed as rapidly as possible and oil should not be allowed to stand for long periods in an emulsified state. Oils from different batches of livers should not be mixed until the stability of each oil has been determined. Because of the known increased instability of vitamin A in deteriorating oils and because the oils are produced for human consumption it follows that only fresh livers should be used. It would be desirable to add to livers at sea preservatives such as formalin or else to make them alkaline. While B.H.A. was found to protect oils at concentrations below the permitted level (0·2%) other experiments indicated that the cheaper butylated hydroxytoluene could partially replace B.H.A. if its use is permitted.—Lyle A. Swain and D. R. Idler, *Progress Report 103, Pacific Coast Stations*, (Canada), 1955, 11.

General view of the Kenya Meat Commission's £70,000 factory at Mombasa.

Meat Factory at Mombasa

THE Kenya Meat Commission's newly opened Mombasa factory, which cost £70,000 and took nearly two years to build, is a smaller version of the Commission's main plant at Athi River, near Nairobi. With a capacity of 3,000 cattle and 7,000 sheep and goats a month, the Mombasa works is the receiving end of the 350-mile stock route from the Garissa and Lamu districts which the Coast Province veterinary authorities are now working on to improve.

The Mombasa factory stands on a promontory jutting into Port Tudor Creek near the Macupa Causeway, which links Mombasa with the mainland. A cooling breeze flowing through the hanging hall, where meat is kept following slaughter, on the second floor of the three-storey building, keeps the day's production fresh until it is sent to Mombasa butchers. Cold storage facilities are available at the port.

By-products

A range of by-products, including hoof and horn and blood meal for fertilisers, meat meal for stock feed, neatsfoot oil, tallow and sinews, issues from the building's ground floor plant.

Since the factory opened last September it has slaughtered an average of 42 cattle and 170 sheep and goats a day. When the supply position improves, production could be stepped up to 65 cattle and 220 sheep and goats daily. All animals killed at the factory are subject to Muslim ritual slaughter.

The factory replaces an old and obsolete municipal slaughterhouse on Mombasa Island. The quality of stock it receives will improve when the work on the stock routes, costing nearly £22,000, is completed by the veterinary department.

Cattle entering the crushes leading to the abattoir.

An interior scene at the new factory showing various meat processing operations.

Stock improvement scheme

The stock improvement scheme provides for holding grounds with controlled grazing and adequate water supplies. It is financed by grants from three sources: £11,710 from Coast Cotton Cess Funds, £2,200 from Livestock Control profits of 1951, and the remaining £7,600 from the Kenya Meat Commission bonus for 1951-52, through the African Livestock Marketing Organisation.

Stock take anything from three to four weeks to reach Mombasa, and the long trek is arduous both for the animals and their Northern Province herdsmen. Before leaving Garissa, cattle may have travelled 100 miles or more, and they then face another 350-mile trek to Mombasa.

The stock route officer in charge of the scheme is spending his first year on the construction of dams, wells and cattle troughs, lion-proof corrals, the demarcation of grazing blocks and the building of permanent African staff housing.

Machinery and Equipment

SECONDS TIMER

Exact timing is claimed by English Clock Systems for their new 8 in. seconds timer.

The new model can be either wall-mounted or free-standing. It is operated by a stop/start lever and plunger which brings both hands back to zero and winds the timer.

The timer weighs 3 lb. 8 oz. It costs 95s. (more with a luminous dial) and delivery is approximately 14 days.

CAP LINING MACHINE

A new bottle and jar cap lining machine which automatically inserts and presses home press-fit pre-cut liners (wads) of cork, board or other material into caps is being produced by D. Trapow Ltd. It will deal with 50 to 150 caps per min. (2 in. dia. × 1 in. high) and has infinitely variable speed control. An electrical limit switch stops the machine when the wadding is faulty or when no wads or caps are present.

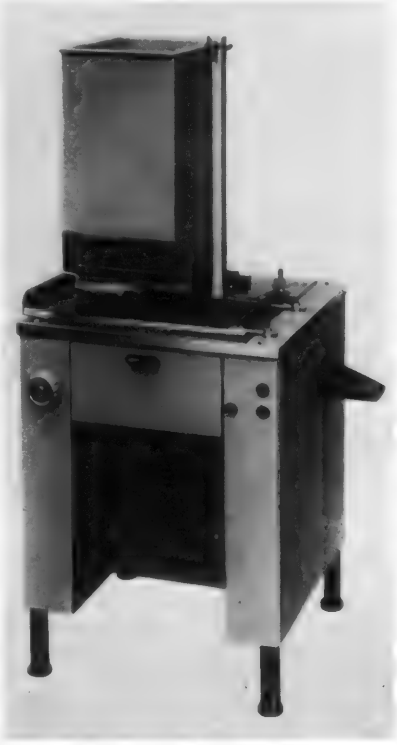
The machine, which has a length and width of 24 in. and a working height of 30 in. adjustable over a range of 4 in., is mounted in a steel frame and the main mechanism is enclosed behind guard panels. Start, stop, inch and speed controls are all located at the front of the machine and the speed control mechanism may be locked internally. Plenty of knee room has been allowed for the operator when seated at the feed table. The standard speed of the ¼ h.p. induction motor is reduced in two stages, first through a variator and then through a 20-1 totally enclosed worm gear box, both units being connected by vee-ropes.

The outer panels of the machine are in stoved enamel, the standard colour being light grey. Other parts are chrome-plated.

BINS FOR BULK HANDLING

A bulk handling system for the sugar and flour using and similar trades, which consists basically of portable aluminium bins, together with specialised filling and discharging equipment, is being introduced in this country by the Tote bulk materials handling division of Pressoturn Ltd. The system has been successfully applied in the U.S.A.

The bins are made of heavy gauge high strength aluminium alloy designed for easy handling and made in three standard sizes. For each size of bin the standard filling aperture is 9-in. dia. and the discharge door 34-in. x 14¾-in. Other features of the system are a spinner head unit and jolter designed to ensure full capacity loading of fine powders during filling operations and a tilt discharger which tilts the loaded bin to the required angle for discharging into any processing equipment.



New cap lining machine.

It is claimed that the compact storage made possible by the use of the bins will save 25% of the space usually needed for bulk materials storage without using double-stacking. Products are completely protected from outside elements and the transport of the bins only requires their loading on to any flat-bed vehicle available. The system enables the customer to take advantage of bulk discounts but does not tie him to the supplier who can deliver in bulk vehicles. Other advantages of the system are said to be that no fixed structures are necessary for the storage of materials and there is no sifting or blow-back when discharging materials from the bin. When the loaded bin is placed in the tilt unit a gasket is compressed to enclose completely the discharge area.

PILOT VALVES

The introduction of their new electro-magnetic pilot valves is considered by the Baldwin Instrument Co. Ltd., to be "the most important development which has occurred since we commenced manufacturing pneumatic equipment." They claim that they are the most efficient and reliable electromagnetic pilot valves yet produced.

The valves are of the "glandless" poppet type, employing a new type of actuator of advanced design and performance. Baldwins say the development of a very efficient magnetic circuit, combined with optimum coil design has resulted in a compact and powerful unit, capable of handling fluids at higher pressures and flow rates than has previously been possible. Two models are available, both utilising the same electro-magnetic actuator, but fitted with slightly different valve mechanisms.

The unbalanced version (type V7/11) has a full bore capacity of 3/32 in., and will handle compressed air or hydraulic oil at working pressures up to 150 p.s.i. The balanced version (type V23/11) has a full bore capacity of 3/16 in., and will handle either of the above working fluids at pressures up to 100 p.s.i. Both units may also be used for vacuum service.

BELT SLING

A new wire belt sling has been introduced by the British Wedge Wire Co. Ltd. Official sales of the *Wedco* sling have only recently started though the company say that they have been used for some considerable time.

The transverse looped wire construction of the belt is claimed to eliminate kinking or tangling and to allow the sling to bend easily round articles of small diameter. The handles are designed to allow for the use of either a basket or a choke hitch. Heavy duty 10-gauge steel wire fabric is used in the standard range of slings and is suitable for most applications, but they can be made in other materials. Slings can also be supplied with the wire fabric suitably covered.

Each sling is given a record number which is stamped on a metal nameplate affixed to the female handle of the sling; the nameplate also gives the safe working load in tons (where required the safe working load is stamped in short tons (2,000 lb.) and in these instances the tons figure is followed by

PEA SORTING

Battery of 140 electronic pea-sorting machines recently installed by Batchelors Peas Ltd., at their Worksop pea-grading factory. Each unit contains 10 machines and 4,200 peas can be sorted per sec. Makers of the sorters are Devices Ltd.

a capital "S") and the date on which the sling was subjected to a proof load of twice the safe working load. Original test certificates from a recognised testing house are retained in the firm's files for reference and a copy of this certificate is issued with each sling.

BATTERY TRUCKS

The loading of up to 1,200 tons of packet sugar a day at Tate and Lyle's Liverpool refinery is handled by six driver-controlled battery electric trucks supplied by Wingrove and Rogers Ltd.

Standard-size pallets, each loaded with one ton of sugar, arrive on the ground floor elevator and are then moved by platform trucks to the edge of the loading bay within reach of fork trucks operating on a lower level. Unit loads, 5 ft. 10 in. in overall height, are then stacked three high by the fork-lift trucks in the storage area. Each of the three platform trucks moves 40 tons a distance of 40 yards per hr., and the three fork-lift trucks are claimed to have trebled the capacity of the store.

The trucks frequently work a 24-hr. day, their *Exide-Ironclad* batteries being exchanged at 8-hr. intervals. The firm have instituted an operator training scheme with a licence on qualification.

BOTTLE BRUSHERS

Two inside bottle brushing machines, particularly suitable for cleaning small quantities of heavily soiled bottles or rejects from normal bottle washing arrangements, have been produced by The Thomas Hill Engineering Co. (Hull) Ltd.

The *Swift* (twin) machine is fitted with a ¼ h.p. self-contained totally enclosed electric motor, the necessary reduction in speed from motor to brush spindles being obtained by gearing. Two different size brushes can be used, if desired, allowing for the handling of different sizes of bottles without change of brushes.

The *Wasp* is also fitted with an enclosed motor (⅛ h.p.) and a modern Vee-belt drive is incorporated to reduce the speed of the brush. Both machines can be supplied to suit either A.C. (single phase, 50 cycles, up to 250 volts; 3-phase, 50 cycles, up to 440 volts) or D.C. (up to 250 volts) systems, and can be fitted with *Perspex* anti-splash brush shields for a small extra charge.

Additional accessories included in both cases consist of a starting switch for wall mounting and two spanners for the brush holders.

FILLING MACHINE

The *Arnfield* filling machine, is marketed by J. and E. Arnfield Ltd., an associated company of Mono Pumps Ltd. It is used for continuous extrusion of sausage meat or similar food products and is claimed to increase output per operator by more than 50% over that of other filling methods. No time need be wasted on batch charging as the receiving hopper can be fed by chute or conveyor direct from the mincing machine. The filler is electrically operated and needs no compressed air.

Sausage meat is fed by stainless steel worm screws to a *Mono* pumping unit which is controlled by a variable gear to deliver between 1,000 to 1,200 lb. of sausage meat per hr. A smaller machine with an output of 400 lb. per hr. is to be produced. The filling action of the Mono pump, which evenly distributes the fat around the sausage meat, is claimed to have a beneficial effect on the storage life of the finished product. It is also claimed that the original colour of the sausage meat is retained and that the steady rate of delivery ensures sausages of uniform size and weight. The filler is suitable for filling any size or type of sausage.

All parts of the machine can be quickly exposed for cleaning and sterilising.

Loading sugar at Tate and Lyle's Liverpool refinery.

News Digest

Food orders instead of codes of practice?

Ministry of Food officials are consulting the Food Standards Committee about the possibility of replacing codes of practice for the manufacture and sale of food by statutory requirements.

This follows the submission by the County Councils Association and the Association of Municipal Corporations of a number of comments on the present state of the law dealing with the labelling and composition of food. The associations suggested, that food standards were of little value to local authorities unless the standard of composition or minimum standard of composition could be determined analytically.

The associations also suggested that if standards could be determined analytically and warranted publication, they should be included in statutory orders enforceable by local authorities and not in codes of practice which had no legal standing. They suggested that the Food Standards Committee should be invited to review all codes of practice. On this point, the Ministry said consultations were going on with the Food Standards Committee, but that before submissions were made it will be necessary to get the views of other interested parties concerned with the code and that this was being done.

Two other points made by the associations were that where a single variety of meat or fish paste was named, no other variety of meat or fish should be used in the composition and that in the case of named mixtures the names of the varieties and the proportions in which they were used should be required to be declared on the label. An alternative to this was that the minimum proportions for each of the several varieties should be prescribed by a food standards order.

Antibiotics and fish

The effects of antibiotics on the preservation of fish were studied by scientists from the Food and Agriculture Organisation and from many countries at a recent conference in Rotterdam, under the chairmanship of Dr. G. A. Reay, superintendent of the Torry Research Station.

Papers read dealt mainly with experiments in Canada, the U.S.A., Japan and Europe on the preservation of fish with "Acronize block ice" developed by the Lederle Laboratories Division of American Cyanamid Ltd. They included papers by Dr. H. L. A. Tarr of the Pacific Fisheries Research Station, and by Dr. J. M. Shewan of the Torry Research Station who described experiments on board the research trawler *Sir William Hardy* with "Acronize block ice."

Food scientists on call

A self-contained liaison and advisory unit for members and non-members alike has been set up by the British Food Manufacturing Industries Research Association. Non-members will be offered a first "free sample" of the unit's services.

Describing the new service, Dr. F. G. Banfield, director of research said, "We aim to solve a problem which is causing the Government grave concern—getting across the results of research to the production man and the business man."

Dr. Banfield particularly stressed the advantages of the service to small firms not employing chemists. For instance, specifications with which raw materials should comply to ensure their suitability for any particular processing could be provided on request. The association could then make checks on samples, at intervals, in its laboratories.

Additional scientific staff has been recruited to tour the country visiting food factories, and scientists will be on call to go to any factory where they are required.

Food science in Scotland

A department of Food Science, the first of its type in Scotland, is proposed for the Royal Technical College, Glasgow, as one development in keeping with the Government's call for improved technical training facilities. Dr. J. Hawthorn, at present on the staff of the College Bakery School, will be the principal lecturer. Entry will be limited and the course will be a four-year one, covering cereal chemistry, industrial fermentation, and all scientific aspects of food preservation. Food manufacturers in the Scottish area have already indicated a definite interest in this development.

Technical bookshop

All books reviewed in FOOD MANUFACTURE and other scientific or technical books may be obtained from:

Technical Books,
308, Euston Road,
London, N.W.1.
Telephone: Euston 5911.

Prompt attention will be given to all orders.

Scottish food hygiene council

A Scottish Food Hygiene Council is to be set up under the Food and Drugs (Scotland) Act, 1956. It will advise the Secretary of State on draft regulations and codes of practice relating to the hygiene of food, draft orders concerning the registration of manufacturers and traders in the food industry, and draft regulations on food labelling. The chairman of the council will be Sir William McNair Snadden, Perthshire farmer and former under-secretary of State for Scotland.

Food hygiene: shrimps and pickled onions

To give effect to the undertaking given to the House of Commons on April 18, the Food Hygiene Regulations, 1955, have now been amended by the Minister of Health, in conjunction with the Minister of Agriculture, Fisheries and Food, so as to permit the peeling of shrimps, prawns and onions by outworkers to continue for a further period until January 1, 1957.

The preparation and packing of other foods by outworkers is not affected. These were prohibited as from July 1, as already provided in the Food Hygiene Regulations, 1955.

The undertaking to amend the regulations in this way was given so as to avoid uncertainty while the Minister was considering whether some way could be found of avoiding complete prohibition in respect of the picking of shrimps and prawns for potting by outworkers subject to satisfactory safeguards in respect of hygiene. Similar assurances were given about onions.

Interested organisations have been consulted on the proposal to make these amending regulations, and they have been referred to the Food Hygiene Advisory Council.

Sausage makers' new laboratories

An extension to their central laboratory at Evesham was recently opened by the chairman of the Richmond Sausage Co. Ltd. The new laboratories have been designed and equipped for centralised quality control of the products from the six Richmond factories and to facilitate experimental and research projects. Each factory will continue to carry out its own on-the-spot quality checks.

The new block—which is under the control of Mr. P. G. Goose, the company's chief chemist—consists of three departments, for chemical, bacteriological and routine quality control respectively. There is also an experimental kitchen and a library.

Hurricane hits sausage makers

Sausage manufacturers are concerned at the sharp rise in the price of seasonings following the damage done by hurricanes in the West Indies last winter.

An official of Wall's said: "The price of ginger has risen from £16 to £27 per cwt. Nutmeg has gone up 11d. per lb. and mace has increased from 10s. and a short time ago reached £1 5s. per lb. Shortage of these spices is acute and it is not possible to find other sources of the same quality for these essential ingredients. We have obtained these spices from the West Indies for the past 30 years."

Price of Wall's sausages, recently reduced for pork and beef lines, will not at present be affected, additional spice costs being borne by the manufacturers.

Smedley's re-equip cannery

A Mitchell-Webster hydrostatic steriliser is being installed by Smedley's at their Spalding, Lincs., cannery, at a cost of £25,000.

The unit—similar to the one installed by the company in their Faversham cannery last year—will handle over 400 cans of garden peas per min., accommodate two sizes of can at the same time and deal in all with four different can sizes.

The installation is part of a £50,000 improvement programme at the Spalding factory. Bean snippers, stainless steel tops for fruit and vegetable preparation tables are to be added and improvements will be made to the pea production line.

In-plant chlorination for cannery

On a hillside facing its Sheffield factory, Batchelors Peas Ltd. have just completed a 200,000 gal. concrete water tank, fed night and day by mains supply. Pipes sunk into the face of the hill, carry the water down to a chlorination plant at the foot of the hill. This has been built to bring into use the "in-plant chlorination" method of keeping equipment clean. The water is so treated with chlorine that it prevents the growth of harmful bacteria in the canning machinery and thus minimises the risk of contamination of products.

Shredded Wheat change of name

The Shredded Wheat Co. Ltd., a subsidiary of the National Biscuit Company of New York, have changed their name to Nabisco Foods Ltd. The change has been made solely because of the broadening of the range of the company's products. The company says: "There has been no change in ownership or management."

News for Importers

Canned grapefruit.—Details of the licensing arrangements for the import of a limited quantity of U.S. canned grapefruit, to be purchased by private traders in the U.K. with funds made available under the U.S. Mutual Security Act, 1954, (*see* FOOD MANUFACTURE, July, p. 303) have now been released by the Board of Trade in Notice to Importers No. 783.

Lemon juice.—In Notice to Importers No. 784 the licensing arrangements were announced for the import from the U.S.A. of a further limited quantity of lemon juice containing not more than 65% by weight of commercial sweetening matter, to be purchased with dollars made available under the U.S. Mutual Security Act, 1954, (*see* FOOD MANUFACTURE, January, 1956). The lemon juice will not be eligible for any U.S. export subsidy.

Milk and Dairies Regulations, 1956

The Minister of Agriculture, Fisheries and Food and the Minister of Health have made the Milk and Dairies (Channel Islands and South Devon Milk) Regulations, 1956. These regulations specify four descriptions of milk and restrict the use of the descriptions, "Channel Islands," "Jersey," "Guernsey" and "South Devon" to milk which has not less than 4% by weight of milk fat.

The enforcement of the regulations is the responsibility of food and drugs authorities in their respective areas. The Milk (Great Britain) Order, 1954, has been amended.

Pigs and bacon marketing report

The establishment of a Pig Industry Development Authority and new arrangements for the negotiation of prices of pigs bought by curers in place of the pre-war arrangements, are the two main recommendations of the Re-organisation Commission on the Marketing of Pigs and Bacon whose report has now been published (Cmd. 9795). The Commission was appointed last year to review the pre-war arrangements for marketing pigs and to recommend what changes should be made.

The Commission recommend that a Pig Industry Development Authority should be established by Statute to draw up and put into effect a programme for securing improvements in the whole field of pig production, processing, and distribution. It should have an income of from £500,000 to £1 million.

The proposed new arrangements for the negotiation of prices of pigs would be administered by a Marketing Supervisory Commission of the Development Authority, by a Pig Producers' Board and by a Bacon Curers' Board.

Company Profits and Prospects

Lyons' profits

Net profit after all charges of J. Lyons and Co. Ltd. for the year ended March 31, 1956, was £762,261 (£728,336). The balance of net profit for the year is £67,075.

A final dividend of 3s. 6d. per £1 unit (making 4s. 6d. per £1 unit for the year) was made on the Ordinary stock.

*

Cheaper cocoa cuts chocolate profits

Yet another company has reported lower profits due to the fall in the price of cocoa beans last year and the subsequent writing down of stocks. Lord Mackintosh of Halifax, chairman of John Mackintosh and Sons Ltd., reported that profits for the year fell by £320,000. Sales had increased by 5·4%.

Net profit after tax was £424,296 (£803,557) and a 10% Ordinary dividend was declared.

*

Biscuit profits up

A high demand for their leading line, *Chocolate Penguin* was largely responsible for a record turnover, reported the chairman of Wm. MacDonald and Sons (Biscuits) Ltd., at their annual meeting. The new chocolate biscuit introduced last year, *Yo-Yo*, was now being distributed nationally and was doing well. Mr. MacDonald said that the installation of new plant for the bulk handling of fats had been completed since the close of the financial year and was now in operation. Plans are in hand for the installation of automatic equipment for bulk storage and handling of flour and sugar.

The company's profit before tax for the year was £344,743 (336,470). A final dividend of 15% less tax was recommended, making, with the 10% interim paid in January, a total of 25% for the year.

▪

"600 Group" re-organise

The name of the parent company of George Cohen Sons and Co. Ltd. is to be changed to The George Cohen 600 Group Ltd. (or such similar name as may be approved by the Board of Trade). A new subsidiary company will take over the trading activities of the parent company and will adopt the name of the latter, *i.e.*, George Cohen Sons and Co. Ltd. The re-named parent company (The George Cohen 600 Group Ltd.) will thus become solely a holding company controlling the "600 Group."

These arrangements will in no way affect firms with whom the company does business or has entered into agreements. The loan stock trustees have been consulted and have indicated that their consent to the re-organisation will be forthcoming.

Erections and Extensions

T. Wall and Sons, Ltd., are planning the erection of an ice cream depot in Erskine Road, Rotherham, Yorks.

*

W. H. Smart and Co., Ltd., ham curers, are planning to build a factory on Arthur Street Factory Estate, Redditch, Worcs.

*

Spooner's Bakeries, Ltd., are seeking permission to build a bakery on a site in Adams Street, in the Duddeston and Nechells re-development area of Birmingham.

*

James P. M. Robertson, Ltd., preserves manufacturers, are extending their factory in Bromley Road, Catford, S.E.6.

▪

R. L. Jones and Co., Ltd., soft drinks manufacturers, are building an extension to their factory in Corporation Street, Mansfield, Notts.

▪

Bolands, Ltd., bakers and confectioners, are having a biscuit factory erected at Dublin.

▪

Argyllshire County Council are constructing a new fishery harbour at Carradale at an estimated cost of £50,000.

▪

T. Hanley and Sons, Ltd., corn millers, propose erecting a six-storey warehouse in Dockin Hill Road, Doncaster.

▪

Dicky Bird, Ltd., ice cream manufacturers, are extending their factory in Alfred's Way, Barking.

*

Thompson and Norris Manufacturing Co., Ltd., corrugated case manufacturers, have received permission to build a warehouse on a site at Turnhouse Road, Edinburgh, at an estimated cost of £37,000.

▪

F. Holt and Sons, Ltd., confectionery manufacturers, are planning the conversion of buildings at Cwmdu foundry, Cwmbwrla, S. Wales, into a sweets factory.

*

Associated Dairies and Farm Stores Ltd., plan to erect a bakery at 11-15, Trinity House Lane, Hull.

▪

Rockware Glass, Ltd., glass container manufacturers, are planning to erect additional factory premises on a 30-acre site in Wheatley Hall Road, Doncaster.

Overseas Enquiries

Puerto Rico: Scotch whisky

F. Badrena E. Hijo, Inc., P.O. Box 3147, 302 Comercio Street, San Juan, Puerto Rico, wish to contact a British firm interested in obtaining direct representation for the sale of Scotch whisky. They are considered to be a suitable connection for United Kingdom firms.

Those interested should write direct to F. Badrena E. Hijo, Inc., at the same time notifying the British Consulate, San Juan, Puerto Rico.

▪

Barbados: Biscuits

Frost and Co., P.O. Box 8, 206 K.R. Hunte's Building, Lower Broad Street, Bridgetown, Barbados, wish to represent a British biscuit manufacturer. They are considered to be a suitable connection for U.K. firms.

Interested manufacturers should write direct to Frost and Co., at the same time notifying the U.K. Trade Commissioner, Colonial Building, South Quay (P.O. Box 225), Port of Spain, Trinidad.

*

Saudi Arabia: various foods

The Family Co-operative of Jedda are interested in receiving offers from suppliers of British tinned and bottled foodstuffs of all kinds (excluding pork and pork products); non-alcoholic beverages including squashes, cordials, fruit juices, etc; confectionery and chocolates (especially gift boxes); and biscuits.

Letter of credit payments are promised.

Those interested should write direct to the Jedda concern quoting prices c.i.f. Jedda with samples, if possible, at the same time notifying the Commercial Secretariat, British Embassy, Jedda, that they have done so.

*

Germany: food equipment

Karl Mann K.G., Hildesheim, Lower Saxony, Michaelisstrasse 53, wish to represent British manufacturers of brewery, dairy and food-processing machinery and requisites in Western Germany. They wish to operate either on a consignment or commission basis. Their 320 page catalogue shows that they handle all types of equipment concerned with dairying, including large milk canisters, deep freeze installations, milk coolers, cheese moulds, butter making machines, complete milk bar installations and milk laboratory instruments. The firm already buy considerably from the U.K.

Interested suppliers should write direct to Karl Mann, Hildesheim, at the same time notifying the British Consulate-General, Duesseldorf 10, Cecilien Allee 16, that they have done so.

Ind Coope's new beer

Ind Coope and Allsopp Ltd. have marketed a new canned beer called *Long Life*. It is claimed to remain fit to drink after six months' storage, considerably longer than is normal for bottled beer. It is stated to be the only canned beer available in the U.K. in two sizes—a 16 oz. and half pint.

The company's marketing scheme is a long-term project based on the assumption that home beer drinking will increase. Advertising, which will not be on a large scale to begin with, is aimed particularly at the housewife.

Standard for smoke alarms

In consequence of recommendations made by the Beaver Committee on Air Pollution, the British Standards Institution has now issued a new standard (B.S. 2740) for simple smoke alarms and alarm metering devices. It is the first of a series of standards which B.S.I. was asked to prepare and is designed particularly to help the smaller manufacturer combat air pollution and economise on fuel; by following its recommendations he can also be confident that his plant is being operated to confirm with impending legislation.

During the final passage of the Clean Air Bill through the Commons, a clause was inserted enabling the Government to make regulations requiring smoke measuring instruments to be installed and used. Complex measuring equipment (for which another standard is being prepared) has been available for a number of years, but because of its relatively high cost it has often been beyond the reach of some firms. Publication of B.S. 2740 will help the smaller firm in this respect.

The instruments covered in this standard normally consist of three fixtures to be installed on industrial chimneys (*a*) a light source such as a lamp and projector, (*b*) a receiving unit consisting of a photocell and amplifier, and (*c*) a visual or aural alarm. When the alarm bell rings or the light flashes, it will be the responsibility of the plant operator to adjust firing conditions so that smoke will be reduced.

In addition to the alarm mechanism, two kinds of simple metering device are specified which can be used to record the number of alarms given and their duration. Records from such meters could be used by manufacturers as a defence in any action brought against them under the Clean Air Bill when it becomes law.

It is important to note that the instruments specified in the new standard will only record black or grey smoke, not white or coloured smoke; nor will they be suitable, for example, where boilers are fed with pulverised fuel.

Copies of the new standard may be obtained from the sales department, B.S.I., 2, Park Street, London, W.1., at 3s. net.

OBITER DICTA

● Starlet Vikki Dougan in a Chinese restaurant, was asked, "How would you like your rice?" "Thrown at me," she replied.—*Sidney Skolsky, New York Post.*

● If the few surviving rabbits manage to repopulate the British Isles, cookery books of the future may perhaps again print recipes for rabbit with a footnote, "Chicken can be substituted."—*Manchester Guardian.*

● Dextran can be used to make cones for ice-cream which are said to be non-fattening, and moreover, tend to neutralise the weight-producing effects of the ice-cream they contain, according to a recent patent.—*Chemical and Engineering News.*

● Caviare is usually mentioned with bated breath by the would-be epicure, but I think it is the most revolting mess to be put before an innocent gourmand and fit only to be lapped up or scorned by the domestic cat.—*Letter to Evening Standard.*

● Mrs. Sophia Wellstead tossed off her usual sleeping potion of a tall glass of gin and port wine last night after celebrating her 105th birthday. "It has never done me any harm," she told a reporter, "and it is too late now to start wondering if it might."—*New York Herald Tribune.*

● Cheese is the adult form of milk, no longer liquid but solid or semi-solid. Some cheese acquires with age colour and smell (and, sometimes, also cheese-mites, which strict vegetarians detest, although they are—the cheese-mites—quite harmless).—*André Simon in Cheeses of the World.*

● The only objects of value left were my textbooks. For a week I resisted temptation. Later I unashamedly took the lot to the second-hand bookshop in Gower Street, saying at every meal a grace to its provider. Whitby and Britton's *Disorders of the Blood* gave only bacon and eggs and coffee in a teashop; but Price's *Textbook of the Practice of Medicine* was much more nutritious and ran to tomato soup, steak and chips, a pint of beer and apple tart.—*Richard Gordon in Doctor At Large.*

Frozen fish sticks

Frozen fish sticks are being manufactured by F. G. Pearce Ltd., to counterbalance the purely seasonal appeal of their ice cream products. Known as *Snofresh*, the fish sticks are being sold in cartons of eight. It is claimed that they will keep for several days in the ice-making compartment of a refrigerator.

Bacon for babies

Trufood Ltd. have added another new variety to their *Spoonfoods* range of baby foods. This is a combination of bacon and vegetables—potatoes, split peas, swedes, onions, haricot beans, and tomatoes. It is intended to help train the palate of the older infant about five to six months upwards for an adult diet. The new food is pre-cooked and packed in 2½ oz. sterile glass jars retailing at 9½d.

Large lumps for red bears

Exports of British refined sugar to the Soviet Union may result from the visit of a troupe of performing bears from Russia to Great Britain. The bears were appearing in the Moscow State Circus, making its first appearance in England in June.

After the London appearance, the circus went to Belle Vue, Manchester, where the sugar available was unsuitable for the bears. Tate and Lyle, Britain's largest refiners, were telephoned and specifications given of the sugar required. It was about eight times the size of a normal cube, twice the thickness, and each cube weighed about 2½ oz. (about 16 times the weight of a normal cube). The cube cutting machines were specially adapted for the bears' sugar. Within 24 hr. a quarter of a ton of this sugar was made in the Cube House at Thames Refinery in London's Dockland. The sugar was packed in sacks labelled "Lumps for Bears" and despatched by train to Manchester. Before the evening performance "Boukette," the leading "lady," growled her approval of the large lumps, and the sugar has now gone behind the Iron Curtain with the Moscow Circus.

Meanwhile, bears in the London Zoo are demanding the same type of large lumps as those given to their Red brothers!

Changes of address

Foodtech Ltd, are now at: Queen Anne's Place, Bush Hill Park, Enfield, Middlesex. Telephone: Laburnum 6656/6657.

▪

Houseman and Thompson Ltd. have changed their London address to 120, High Street, Edgware, Middlesex. Telephone: Edgware 0111-2-3. Telegrams: Houseman, Edgware.

People

MR. J. VALENTINE BACKES, A.R.C.SC., F.R.I.C., has been appointed joint managing director of Burton, Son and Sanders, Ltd.

■

MR. ALAN SAINSBURY has been appointed chairman of J. Sainsbury Ltd. and MR. R. J. SAINSBURY deputy chairman. They will continue to act as joint general managers.

■

MR. R. A. E. FRANKLIN has been appointed chairman of Mayfair Products Ltd., manufacturing confectioners, succeeding MR. W. S. MARTIN, who remains on the board.

■

COL. ARCHIBALD CHRISTIE, chairman of Independent Dairies Ltd., has resigned from the board. He is succeeded by MR. MICHAEL RICHARDS, who has been associated with the group since 1947.

■

MR. HAROLD F. REDWAY, has been appointed to the board of Procea Products Ltd. Mr. Redway, who has been associated with the company for many years, is the managing director of Redway, Mann and Co. Ltd. and other companies.

■

PROF. HAROLD BURROW has been appointed chairman-elect of the council of the Royal Society of Health. He will assume office on October 1, 1956. The first veterinary surgeon in the eighty years' history of the society to hold this position, Prof. Burrow occupies the chair of medicine at the Royal Veterinary College, London University.

■

MR. WILLIAM G. PROCTER, has been appointed to the board of Fisons Milk Products Ltd., a member of the Fisons Group.

Mr. Procter was recently promoted to the post of unit manager at the company's Coleraine milk factory, Northern Ireland, in place of MR. C. F. STENSON, who left the Fisons Group and resigned his board appointments on May 31.

■

MR. LORIS E. MATHER, C.B.E., M.I.MECH.E., chairman of the board of directors of Mather and Platt Ltd., was recently presented with a portrait of himself, painted by Edward Halliday, R.B.A., at the company's main works in Manchester. The ceremony marked the fortieth anniversary of Mr. Mather's chairmanship and the portrait was subscribed for by the firm's past and present employees both at home and abroad. The presentation was made by Mr. T. Y. Sherwell, senior director of the company.

Mr. Mather first became a director of the company in 1908, assuming the chairmanship in 1916 on the retirement

Mr. Loris E. Mather

of his father, Sir William Mather, P.C., LL.D. In 1918, he was one of the founders of the Manchester Engineering Council, remaining its president for 14 years.

From 1941 to 1942, Mr. Mather was a member of the Treasury Investigation of Ministry of Supply Technical Personnel, and from 1942 until 1945 served as Regional Controller, Ministry of Production; it was for this latter work that he was awarded the C.B.E. A member of the Court of Manchester University and of the College of Science and Technology, Manchester. Mr. Mather is keenly concerned with educational projects and the company still maintains their own school, established by Sir William Mather, providing a vigorous education programme for all juveniles, male and female, on their entry into the firm.

■

MR. COLLAN E. B. BRETT, a director of T. Wall and Sons (Meat Products) Ltd., meat-products' and bacon manufacturers of London and Manchester, has been appointed a member of the advisory committee of the National Pig Progeny Testing Board. Mr. Brett, who is in charge of Wall's bacon production, is himself a pig breeder, farming at Stokenchurch, near High Wycombe, and a leading judge of bacon competitions.

■

MR. H. W. H. ICOUGH, who recently retired from G. A. Harvey and Co. (London) Ltd. after completing 50 years' service with the company, was presented with a gift by the firm's managers and staff. In addition to his duties at Greenwich, Mr. Icough was appointed sales manager of an associate company, William Morrison and Sons Ltd., in 1947.

Mr. Icough has been an alderman of the Borough of Greenwich for a great number of years and in 1953, as a reward for 25 years' public service, he was created a Freeman of the Borough.

■

MR. EDWIN THOMPSON, chairman of Thompson and Capper Ltd., manufacturing chemists, specialising in tablet making for the food and other industries, and MRS. THOMPSON celebrated their golden wedding recently, when members of the company's staff made the presentation of a gift of gold napkin rings engraved with the Thompson family crest. Mr. Thompson was the founder of Manesty Machines Ltd., formed for the purpose of manufacturing the tablet making machines of the F. J. Stokes Machine Co. of U.S.A., of which he secured the sole agency in this country in 1906. Mr. Thompson sold Manesty Machines a few years ago.

■

Riley (IC) Products Ltd., a subsidiary of International Combustion (Holdings) Ltd., announce the following appointments resulting from the death of their chairman, MR. VERNON YOUNG, F.C.I.S.

MR. W. MESSER, D.I.C., A.M.I.C.E., A.M.I.E.E., until now managing director, becomes chairman.

MR. E. W. BARNES, M.INST.F., A.M.INST.B.E. (director), becomes managing director.

MR. J. W. WRAY, M.INST.F., a director of International Combustion Products Ltd, now becomes a director of Riley (IC) Products. The other directors of the company are: MR. W. GRAINGER, M.INST.F. MR. H. C. SHORT, F.A.C.C.A.

MR. A. C. SYRETT, A.M.I.MECH.E., has been appointed general sales manager.

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MR. T. M. SMITH has been appointed managing director of Alfred Bird and Sons, in succession to MR. G. M. LAIMBEER, who is now returning to General Foods Corporation in America. Mr. Smith, at 37, will be one of the youngest managing directors of any large firm in the country. Mr. Smith has been with Alfred Bird in Birmingham for the last eight years. He formerly worked on the marketing side of General Foods in America, coming to England to join Bird's in 1948 as sales promotion manager. In 1949 he became sales manager, and was appointed as marketing director in 1954. In January of this year he was promoted to assistant managing director, in which post he was responsible for purchasing, personnel and research, and was supervisor of all marketing activities for the company.

MR. JOHN BUCK has been appointed marketing director of Bird's. Mr. Buck, who is 39, has been working for the last two and a half years in New York with the international division of General Foods Corporation. Before this he worked for Bird's in Birmingham as sales promotion manager.

B.F.M.I.R.A. Reception

Seen at the reception preceding the luncheon and annual meeting of the British Food Manufacturing Industries Research Association in London on July 5 are (left to right), Mr. R. P. Woollard (London Oil Corporation, Ltd.), chairman of the Council, Prof. A. C. Frazer, who was elected president, Sir Frank Engledow, the retiring president, and Dr. H. J. Channon, a guest.

Contaminated bread outbreak

Bread made from contaminated flour was the cause of the recent outbreak of food poisoning at Pontardawe, reported the Minister of Health in reply to a question in the House of Commons.

The contamination is thought to have occurred during transport of the flour in sacks. Doctors reported 59 cases but there were probably others mildly affected. Symptoms varied with the amount of bread consumed. Half of the patients became unconscious and developed sudden fits lasting several minutes with recovery of consciousness in a 15 to 30 min. Less acute cases suffered from dizziness, weakness, abdominal discomfort and nausea. In most cases there was almost complete recovery in 24 hrs.

Endrin insecticide has been identified as the contaminant.

World meat trade at record level

The volume of international trade in meat last year reached its highest point ever, a new FAO survey shows.

The survey, which appears in the latest issue of FAO's Monthly Bulletin of Agricultural Economics and Statistics, (No. 4, 1956), estimates that the volume of meat entering international trade last year—expressed in carcass meat equivalent and excluding live animals—was between 5% and 6% higher than in 1954.

The greatest rise was for beef, but exports of pigmeat, lamb and mutton were also higher, while the volume of canned meat exports dropped slightly. With some countries still to provide final figures for 1955, total exports of all categories of meat were 1,848,000 metric tons against 1,741,000 tons in 1954.

Among the major exporting countries, Argentina exported in 1955 about 60% more carcass and prepared meat and 30% more canned meat than in 1954. The U.S. exported more meat than in any postwar year since 1947. Denmark's meat exports continued to grow, and 50% more live cattle were exported than in 1954. The Netherlands increased carcass and prepared-meat exports by 50%, and raised exports of live pigs from 6,000 in 1954 to 113,000 head in 1955.

On the other hand, there were sharp reductions in meat shipments from Ireland and Uruguay.

Among the major importing countries, the U.K. imported 13% more carcass and prepared meat and 5% more canned meat in 1955 than in 1954.

Total West German imports, including the meat equivalent of live beasts, rose 14% over 1955. Italian imports of beef and veal and of cattle were just about doubled, and imports of pork and poultry were also considerably higher. Switzerland imported 18,000 tons of meat compared with 10,000 tons in 1954, and imports of cattle were much larger than in the previous year.

The downward trend in U.S. imports which began in 1952 continued through 1955, and the U.S.S.R. and other Eastern European countries also reduced their 1955 imports.

During the last year the average level of meat export prices did not change much from the previous year.

Obituary

MR. ENRICO FACCHINO, one of the best known figures in the ice cream manufacturing industry and founder of the Birmingham firm of Meddocream Ltd. and of Facchino's Biscuits Ltd., died at his home in Birmingham on June 14, aged 83. Mr. Facchino came to this country from Italy in 1899, entering the food industry in 1919 and later specialising in ice cream manufacture and associate products. He leaves four sons and six daughters.

Booklets Received

★The wide range of mechanical handling equipment made by J. Collis and Sons Ltd., is described in a new illustrated folder. The machines shown include trucks, stackers, and powered and gravity-operated conveyors for working in any direction.

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★"What do you expect from a lighting specification?" ask the Benjamin Electric Co. Ltd., on the cover of their new leaflet, and proceed to answer the question by explaining their illuminating engineering service and the organisation that lies behind the presentation of a lighting specification.

■

★The story of a small family bakery business which has grown into a large public company, the Avana Associated Bakeries Ltd., is told in a recent issue of *Diofanfare*, house organ of Transparent Paper Ltd. Emphasis is laid on the packaging of the bakery's products in *Diophane* cellulose film.

■

★The food aspects of their *Sorbester* range of sorbitan esters are described in a booklet issued by Howards of Ilford Ltd. It deals mainly with the legal and medical aspects of the use of these emulsifiers in human consumption and stresses their advantages in products where improvement of appearance, form, palatability and keeping properties are of importance. Copies of this and a companion booklet containing a general description of the individual emulsifiers with details, of their applications and properties, are available on application to Howards.

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★The development of pineapple canning in Kenya is the theme of an elaborately produced coloured brochure distributed by Pickering's Produce Canners Ltd. The brochure describes the growing and canning of pineapples by Kenya Canners Ltd., who employ 400 men and women in their factory, and the part played by Pickerings who market the fruit in this country. Entitled *The Beginning of an Industry*, the booklet also traces the history of Kenya Canners Ltd., which began in 1949, though its origins go back more than 50 years ago, when a family of settlers started planting pineapples.

Scottish Food Fair

In the June, 1956, issue of FOOD MANUFACTURE, p. 257, a reference was made to certain new products on display at the Scottish Food Fair and it was incorrectly stated that the Department of Agriculture for Scotland showed dehydrated products prepared by Torry Research Station. These products were in fact prepared at the experimental factory of the Ministry of Agriculture, Fisheries and Food.

Food News Overseas

Argentine dairy institute

A National Dairy Institute has been formed in the Argentine. It will be composed of representatives drawn from dairy farming, the trade and the Ministry of Agriculture and Livestock. Its chief task will be to improve the quality and increase the quantity of Argentine dairy produce.

Siamese sugar factory

A $7 million sugar refinery is to be built in the Supanburi district of Thailand by the National Economic Development Corporation. The Corporation — a Government-sponsored organisation—plans to extend sugar-cane cultivation in this area.

Equipment for the refinery has been ordered from a French company which has agreed to receive payment on credit over an extended period.

Tubed foods for Antarctic

Sir Edmund Hillary, who is leading the New Zealand contingent of the Commonwealth Trans-Antarctic Expedition, has asked for 250 tubes of varied foodstuffs to be sent to Ross Base. Tubes are said to be among the most convenient food packages for mobile "corps" as they eliminate wastage and can be easily split into appropriate rations.

A further 220 tubes will be among stores for the expedition's Shackleton Base leaving later.

New factories in W. Indies

A new biscuit factory, being built in British Guiana by Continental Biscuit Co. Ltd. (an amalgamation of Bermudez Biscuit Co. Ltd. of Trinidad and West Indian Biscuit Co. Ltd. of Barbadoes), is expected to be in operation by September. The cost of the factory is over half a million dollars. U.S. machinery has been installed.

A new margarine factory is to be built at Providence, East Bank, Demerara, in the near future. Most of the machinery is already in the colony and early production is anticipated.

Humidity-temperature

From America comes the news that two new words have been coined and recommended for use in refrigeration and air-conditioning. The new words are "Humit" and "Humiture" and they refer to the combined measurement of temperature and humidity. Humiture is arrived at, by adding the degree of temperature to the percentage of relative humidity and dividing by 2, and Humit is the unit of Humiture.

An instance is given: if the temperature is 90°F., and the relative humidity 50%, the Humiture is 70 Humits. It is stated that comfortable conditions exist in air-conditioning when the Humiture is between 60 and 75 Humits. Will this method become popular?

Spray-dried milk for S. Australia

The first spray-drying plan for milk in South Australia has been installed in a new dairy factory at Mount Compass by United Co-operative Dairymen Ltd. All other milk-drying plants in South Australia use the roller drying method.

Several advantages are claimed for the low heat spray drying process. As the milk is never hotter than 168°F. during the process, there is no "cooked" or "scalded" flavour present in the finished product; the method also produces a much finer powder, claimed to be almost 100% soluble in water.

Turkey improves her fishing industry

Cold stores, quick-freezing plants and ice factories are being built in Turkey by the Government's Meat and Fish Office in an effort to develop the fishing industry, according to Dr. A. A. Dawson who has been making a general survey of fish marketing and distribution in Turkey on behalf of the F.A.O. He reports that a major difficulty in the modernisation of the industry is the erratic flow of fish landings.

Soft drinks and sweets for Gold Coast

A new *Coco Cola* bottling plant has been set up in Accra by Messrs. A. G. Leventis and is now in production. Demand has been heavy, but a shortage of bottles has caused some difficulty.

A new company has also recently been formed for the production of all kinds of confectionery, such as boiled sweets, nougat, gums, etc. Production is expected to start in about six months' time.

Shell-less eggs

Scientists at Cornell University, U.S.A. are experimenting selling eggs without shells. The eggs are contained in twelve-compartment plastic packets and it is claimed that they are cheaper and just as good as eggs in shell.

Norway's fish record

The value of Norwegian exports of fish and fish products for the current year is estimated at over £50 million, compared with £47·4 million for 1955. The country's annual fish catch is normally about 1,500,000 tons. This year the position has been exceptionally good, the herring fisheries contributing a record yield.

Banana flakes for breakfast

A new breakfast food—"banana flakes"—is being developed in Jamaica. The new product is said to look like thin slices of dried banana and to be produced in a coated, crisp flake while retaining the natural colour and flavour of the fruit.

It will cost about the same as standard breakfast foods of the cereal type. The suggested pack is in two forms—sugar-coated for breakfast and paper-thin for cocktail parties.

Since bananas must be processed within three days of picking to ensure best results, the manufacturing will have to be carried out in Jamaica.

Polish egg and poultry exports

An extensive development of the egg and poultry industry has taken place in Poland during the past six years; an egg sorting plant, storage depots, refrigerating chambers, an egg pulp and egg powder factory and a number of poultry fattening establishments have been added to its potential since 1950.

Eggs, egg-pulp, and table poultry were exported in quantity to Britain, Austria, Germany and Switzerland in the 1950-55 period. The peak of egg exports was reached in 1953 when over 440 million were exported; thereafter the number sent abroad was reduced in view of the demand from the home market. The average annual export of table poultry during the six-year economic plan period which ended last year was about 10,000 tons, and egg pulp exports averaged from 1,500 to 2,000 tons annually.

Packaging

Soft drinks in squirts

A soft drink concentrate in a 16-oz. aerosol container made by the American Can Company is being sold in 58 major American markets by C. C. Long and Son Inc., of Baltimore, under the name *Real Kool*.

One "squirt" of the concentrate—about a teaspoonful—will make a drink with the addition of tap water or sparkling water and ice. The concentrates are in seven flavours—orange, grape, lemon-lime, cola, root beer, strawberry and black cherry. They are also recommended as flavourings for puddings, as bases for punch or for hot spiced drinks.

Wrapping aid

A wrapping aid to simplify the overwrapping of fibre trays in cellulose film has been designed by British Cellophane, Ltd. It can also be used for overwrapping cartons, where machine handling would not be economical and as a general-purpose sealing aid.

Known as the B.C.L. Bias-wrap and sealing aid, it consists of a narrow heater bar mounted on a solid insulated base. In front of the heater bar is a curved metal "forming" plate to facilitate folding the overlapping film. The heater bar is tilted forward slightly so that it is virtually an extension of the "forming" plate, making it possible to move the item being wrapped over the heater bar in one continuous sweep. The heater is wired with a single element and can be run on either A.C. or D.C. It reaches a maximum temperature suitable for the standard heat sealing kinds of *Cellophane*. The aid costs £9 10s.

Tubular polythene packs

One way of making polythene is to extrude it as a continuous tube. The Metal Box Co. has used this particular method to produce *Diothene* bags in a roll. These are sold under the name of *Perforoll* (British Patent No. 751,339). A length of *Diothene* tubing is sealed across and scored across with perforations at regular intervals. The perforations are just below the seal, which becomes the bottom of the bag when it is torn off the roll. Printed rolls are made in a wide range of sizes. For pre-packaging fresh produce, *Diothene* bags are much easier to store and much quicker to handle as *Perforoll*, which can be supplied more cheaply than separate bags when printed in up to three colours.

Printed roll of tubular polythene

Flat *Diothene* sheeting is also sold in *Perforoll* form for other types of wrapping. This does away with the extra work and occasional wastage of film, which arise when sections are torn off a plain roll against a serrated bar.

Boiling food in film bags

What is thought to be the first boilable film bag is being used by a New York restaurant to sell food to its customers, according to *Modern Packaging*. The bag, containing food specialities is boiled in water for about 12 min. and the contents are then ready to serve.

The food is packaged in single-portion, heat-sealed pouches formed from a lamination of polyester and polyethylene films—the polyethylene on the inside providing the heat and the polyester on the outside the high-temperature strength.

The laminated film is prefabricated into pouch-type containers and heat sealed on three sides. The fourth or top seal is machine made after the bags are filled. The filled bags are sold in pre-cooked frozen form.

The first four foods packaged in this way include beef goulash with noodles, Swedish meat balls with herb cream sauce, broiled salisbury steak with mushrooms, and lentil soup with frankfurters. Others to come include corned beef and cabbage, lamb stew and sauerbraten.

PACKING FROZEN CHICKEN

The "Cryovac" method of chicken packing has been adopted by Grimsby Frozen Products Ltd. at their recently acquired model poultry farm, now undergoing development and expansion. The chicken can be cooked in the actual wrapping with the seal just split before cooking is complete, to brown the bird.

New Companies

Stuart Adams (Food Processors), Ltd. (565947.) £100. Dirs.: S. and Mrs. G. Adams, 34, London Road, Irelands Cross, Woore, nr. Crewe; J. V. and G. Adams.

Canbury, Ltd. (567236.) 34, South Molton Street, London, W.1. Agents for and mfrs. of and dlrs. in produce and foodstuffs and livestock of all kinds, etc. £1,000. Subs.: J. J. Kenny and M. J. Maher.

Clare and Pearson, Ltd. (565804.) 56, Hill Street, Middlesbrough. Mfrs. of and dlrs. in sausage skins and casings of all kinds. £2,000. Dirs.: W. Clare and L. A. Rush.

W. Coates and Co., Ltd. (566048.) 24/5, Whitechapel High Street, London, E.1. Wine and spirit mchts. and licensed victuallers, etc. £30,000. Subs.: D. W. and Mrs. P. Clarke.

Country Wines, Ltd. (567069.) York Bungalow, Little Wakering Hall Road, Gt. Wakering, Essex. Brewers, distillers, mfrs. of wines, beers, etc. £300. Dirs.: H. F. Ellis (ch.) and D. F. Rayner.

Essonia, Ltd. (566847.) St. Andrews Works, Woodhead Road, Bradford. Mfrs. of and wholesalers, retailers and bottlers in the marketing of flavourings, essences, etc. £10,000. Permt. dirs.: F. N. and Doris J. Shields.

Gibson Dixon (Soft Drinks), Ltd. (566571.) 6, Gaol Lane, Halifax. £1,000. Dirs.: K. G. and Doris Dixon.

G. Greenwood and Co., Ltd. (565845.) 1, March Street, Burnley, Lancs. Mfrs. of soft drinks, essences, squash, mineral, table and aerated water, and brewers and maltsters, etc. £1,000. Dirs.: G. Greenwood, B. Tattersall and H. D. Pickup.

D. and J. Lewis, Ltd. (565851.) 277, Londonderry Road, Warley, Oldbury, Worcs. Dlrs. in foods, etc. £1,000. Dirs.: D. and Mrs. J. M. Lewis.

Morry Green, Ltd. (565938.) 13, Copthall Avenue, London, E.C.2. Wholesalers and retailers of fruit and greengrocery, etc. £3,000. Dirs.: H. Green and E. C. Burrell.

Merrypop Corn Co., Ltd. (566015.) 179, High Street, Bromley, Kent. Corn importers and preparers of corn in sweetmeat form, etc. £1,000. Permt. dirs.: C. G. and Mrs. E. Hofman.

Norfolk Poultry Packers, Ltd. (566632.) 71, The Close, Norwich. £2,000. Subs.: M. E. Peach and J. M. Place.

Northray Farm Products, Ltd. (566814.) 2a, Abbey Walk, Grimsby. To carry on bus. of freezing fruit, vegetables and food products of all kinds, etc. £10,000. Dirs.: R. Caudwell, B. T. West and G. R. Smith.

Rosegrove Meat Co., Ltd. (567287.) 46, Back Rosegrove Lane, Burnley. To take over bus. of a mfr. of and dlr. in cooked and prepared meats carried on at Burnley by R. Massey, etc. £1,000. Dirs.: R. and Mrs. H. Massey.

Sunda (London), Ltd. (566459.) Mfrs., canners, packers, mchts. and vendors of and dlrs. in foodstuffs, etc. £1,000. Subs.: S. Disborough (clk.) and J. R. S. Hadfield (solr.), 18, Austin Friars, London, E.C.2.

From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.

The Leonard Hill Technical Group this month

Dairy Engineering.—Wellington, New Zealand, Sets Pattern for Municipal Milk Supply; Continuously Working Pasteurising Apparatus; A New Creamery at Bexhill; Bulk Milk Collection Scheme in Scotland; India's Big New Dairy Plant; Handling and Processing of Milk—A Summary of the Problems.

World Crops.—Rice—An Economic and Agronomic Summary; Factors Affecting the World's Food Supplies; Changes in the Structure of West German Agriculture; Precision Surface Drainage for Sugar-cane Land; New Methods for Testing Viability of Seeds; Soviet Agriculture—Official Urge for Increased Production; Report on the French Agricultural Industry.

Manufacturing Chemist. — A Critical Survey of Automatic Titrators, 1; Surface Active Agents in Germicides; Some Recent Progress in our Knowledge of Cystine; Cosmetic Engineering, 3; Progress Reports: Therapeutics, Disinfectants and Disinfection, Hormones.

Petroleum. — Evaluation of Crude Oil in Egypt; Cooling Water for Industry, 2; Recent Trends in Oil Geology, 4.

Corrosion Technology.—The Flame Spraying of Metals and Plastics; A Superficial Glance at the Field of Corrosion; The Cathodic Protection of Underground Steel; Cathodic Protection of the m.s. *Regent Springbox*.

Fibres.—Some Soil-less Cultured Natural Fibres; World's Most Modern Thread Finishing Plant; Balancing High-Speed Textile Spindles; New Techniques and Products for French Textile Industries.

Chemical and Process Engineering.—Pneumatic Tools in Maintenance Work; A Survey of Swedish Industry, 2: Chemical Industry; Reconstruction of a Sulphuric Acid Plant in France; Cationic and Nonionic Chemicals Produced in Lancashire; Tanks, Pits, Vats—Make them Safe; Iceland's New Chemical Works.

Paint Manufacture.—Synthetic Organic Pigments; Amino Coating Resins, 1; Increasing Research Efficiency, 3; Aircraft, Marine and Industrial Finishes; The Use of Styrenated Alkyds.

Trade Marks

APPLICATIONS

CRENDOLA.—748,926. Flavouring essences (other than essential oils). **Thornton and Ross, Ltd.**, The Chemical Works, Manchester Road, Linthwaite, Huddersfield.

ENGEDURA.—748,624. Yeast (for food). **Royal Netherlands Distilleries,** Wateringseweg 1, Delft, Holland, and c/o T. B. Browne, Ltd., 117, Piccadilly, London, W.1.

FOOTBALL MINTS.—747,959. Chocolate and non-medicated sugar confectionery, all being mint flavoured. **Walter Pinless,** 21, Scott Park Road, Burnley, Lancs.

GAYTIME.—743,278. Toffees. **James Keiller and Son, Ltd.,** 9, Albert Square, Dundee, and 20, Soho Square, London, W.1.

GLEN VALLEY.—746,492. Butter. **E. Cropper and Son, Ltd.,** Bridgend Warehouse, Waterfoot, Rossendale, Lancs.

GLUCODIN.—746,532. Glucose and non-medicated preparations principally of glucose for use as food. **Glaxo Laboratories, Ltd.,** 891-995, Greenford Road, Greenford, Middlesex.

KITTOLUX.—747,196. Cat foods. **Ulster Fruit Products, Ltd.,** Cranagill, Annaghmore, Co. Armagh, N. Ireland.

LUCULLUS.—745,290. Seasonings, saffron flavourings, garlic flavourings and spices (other than poultry spice); and 745,291. Fresh herbs and fresh vegetables. **R. Brooks and Co.,** 27, Maiden Lane, Covent Garden, London, W.C.2.

NECTOSE.—748,842. Non-alcoholic carbonated drinks. **Tizer, Ltd.,** Atlas Works, Hollinwood Avenue, New Moston, Manchester.

PALM COURT.—747,481. Tea. **Goodwin Foster Brown, Ltd.,** Hall Street, Dudley, Worcs.

PARTY PIECE.—747,615. Tea, coffee, chocolate and non-medicated boiled sugar confectionery. **Walter Pinless,** 21, Scott Park Road, Burnley, Lancs.

RINGMASTER.—749,265. Port wine and sherry wine. **Gilbert and John Greenall, Ltd.,** The Distillery, 26, Bridge Street, Warrington, Lancs.

SOUR GRAPES.—747,245. Non-medicated confectionery. **G. de Preston Leeper,** Quality Corner, Broad Street, Lyme Regis, Dorset.

SUNBLEST.—746,499. Biscuits (other than for animals), cakes, pastry, flour confectionery, ices, baking powder and cereal preparations. **Allied Bakeries, Ltd.,** Weston Centre, 40, Berkeley Square, London, W.1.

SOUTHERN VALES.—748,762. Wines. **Stephen Smith and Co., Ltd.,** 51, Malmesbury Road, Bow, London, E.3.

STRONGARM. — 746,767. Beer, ale, stout and porter. **J. W. Cameron and Co., Ltd.,** Lion Brewery, West Hartlepool, Co. Durham.

SWEET THOUGHTS.—745,430. Non-medicated confectionery. **Quality Foods, Ltd.,** 179/181, Park Avenue, London, N.W.10.

TOBLER CLASSIQUE.—747,444. Chocolate, chocolates and non-medicated confectionery. **Chocolat Tobler, Ltd.,** 20, Soho Square, London, W.1.

VAN COCKLES.—748,798. Preparations made from cereals for food. **Crystal Confectionery Co., Ltd.,** 1-7, Croft Street, London, S.E.8.

Information and Advice

This Service is available to subscribers to FOOD MANUFACTURE. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Salad cream

B.7867. *Please let us have a commercial recipe for the manufacture of salad cream.* (Blackpool, Lancs.)

If you have a stable emulsion and your oil does not contain free acid it should keep satisfactorily if bottled in airtight containers. You must be careful to avoid beating air into the mixture and to prepare it under perfectly hygienic conditions; utensils must be dry. The vinegar, mustard and salt will act as preservatives. Omitting flavouring agents which do not affect the persistence of the emulsion, the following is a typical formula:

	Per cent.
Oil	75.0
Salt	1.5
Egg yolk	8.0
Mustard	1.0
Water	3.5
Vinegar	11.0

The oil is dispersed in the aqueous phase (water and vinegar) with the aid of the emulsifying agents (egg yolk and mustard) and a high speed beater of the wire whisk type or homogeniser. For a gallon batch the egg yolk and solid mixture is beaten for 5 min., addition of oil takes another 10 min., and addition of the vinegar 1 min. Finally the mixture is stirred for 1 min. at slow speed. The beater should be below the surface. We suggest that you reduce the oily portion if the flavour is too oily. Do not let any oil drip into the finished batch as this will cause separation.

Sugared egg yolks

B.7855. *Please give us some information on the preparation of sweetened frozen egg yolks.* (Milan, Italy)

The sugar concentration used should be about 10% of the weight of the yolks. Corn sugar (dextrose or glucose) or invert sugar are said to be more effective than cane sugar (sucrose) in eliminating coagulation of the egg lecithin, which is the main difficulty in freezing egg yolks.

The eggs used for freezing are chilled and then candled to eliminate the cracked and the more readily detectable spoiled eggs. The eggs are then broken and any showing signs of deterioration are immediately rejected. Great care must be taken to prevent any trace of the bad eggs coming into contact with the shelled eggs for freezing. Cracked eggs and leakers are never used. Even if they show no sign of decomposition, such eggs usually contribute a high bacterial content to the finished product.

For both whole eggs and egg yolks, the yolk membrane is first broken by churning. This leaves the mass homogenous and also affords the conditions necessary for the addition of sugar to the yolk. The egg is then run into containers and moved to the freezing chamber.

Freezing temperatures between $-10°$ and $-40°$F. are usually used, often in combination with some form of rapid air movement. The main objects of these low temperatures are to decrease the temperature of the liquid rapidly below the zone of bacterial multiplication and to improve the uniformity of composition of the frozen material within the tin (which may contain up to 40 lb. of material). In the U.S.A. the holding or storage temperature after freezing is usually 0°F. or below, but frozen eggs have been shipped to this country from China at 14°F. and stored at that temperature after arrival.

Not only is it essential to minimise the multiplication of bacteria during manufacture, but care must also be taken to control the degree of separation of white and yolk—commercially prepared yolk always contains some white. Otherwise the solid content of the yolk—which must often conform to a specification—may fluctuate considerably. Plant control is facilitated by the use of a refractometer for the rapid estimation of solid contents.

In some plants emulsification and filtration are combined by pumping the liquid through a milk-type line filter fitted with a mesh of stainless steel; two filters are placed in the pipe line in parallel, one being used while the other is cleaned.

Information supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery and materials, and also general information as follows:

B.7797. *Information on the manufacture of canned bread.* (Belfast)

B.7798. *Literature on the manufacture of vinegar.* (Batlow, N.S.W.)

B.7800. *Advice on storing eggs for long periods.* (Nairobi, Kenya)

B.7801. *Information on prepackaging dried fruits.* (London, E.C.3)

B.7802. *Manufacturers of vegetable cubing attachments for food machinery.* (London, W.2)

B.7803. *Information on use of sodium mono-glutamate.* (London, N.1)

B.7804. *Suppliers of device for tying knots in twine.* (Kanturk, Co. Cork)

B.7805. *Information on manufacture of Dutch apple product.* (Auckland, New Zealand)

B.7806. *Information and advice on grinding curry powder.* (Bristol)

B.7807. *Formula for fruit filling for pies incorporating agar agar.* (Huddersfield)

B.7808. *Machinery for roasting peanuts.* (Henley-on-Thames)

B.7809. *Information on the use of sodium nitrate in meat products.* (Darlington, Co. Durham)

B.7810. *Advice on manufacturing salted peanuts.* (Canterbury, Victoria)

B.7811. *Information on manufacturers of fresh and preserved fruits.* (Verona, Italy)

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

754,336. ELECTRONIZED CHEMICALS CORPORATION: Treatment of food substances.
754,323. R. BOSCH GES.: Ice trays.
754,146. FREARS, LTD.: Packaging of biscuits and similar products.
753,747. MORTLOCK'S MODERN DAIRIES, LTD.: Beverages.
753,769. FOOD MACHINERY AND CHEMICAL CORPORATION: Method of bleaching cellulose pulps.
753,236. H. T. WILLIAMS: Receptacles for preserves and similar foodstuffs.
752,886. WISE POTATO CHIP CO.: Method of producing protein hydrolysate from potatoes and potato waste.
753,040. ROOTRY ESPLOITATIE MIJ N.V.: Margarine.
752,922. ARMOUR AND CO.: Method for the treatment of milk and soft curd milk produced thereby.
752,994. CONTINENTAL CAN CO., INC.: Method of and apparatus for packaging merchandise in flexible bags.
752,661. NATIONAL CYLINDER GAS CO.: Confection and method of manufacture.
752,579. O. W. CHRISTENSSON: Apparatus for assembling piles of unit packages for insertion into packing cartons or cases.

ABSTRACTS OF BRITISH PATENTS

Quick-cooking rice

Quick-cooking rice is obtained by hydrating the grains in stages and gelatinising the starch throughout at an intermediate hydration stage by heating to the gelatinising temperature in the absence of excess water.—746,787. *General Foods Corp.*

Substitute meat

Food products having a texture simulating cooked meat products consist of a cohesive non-homogeneous mass comprising substantially discrete particles of a chewy protein gel.—746,859. *Unilever, Ltd.*

Popcorn package

Popcorn kernels fill a container, and popping oil in the same container fills the spaces between the kernels.—747,022. *Rose Kist Foods, Inc.*

Bags for tea, coffee, etc.

A strip of textile material, which is not thermoplastic or heat sealable, is provided with adjacent pre-formed individual pockets which are open along a longitudinal edge of the strip, the pockets being opened and filled in succession, the edge then being folded and hem-sewn to close all the pockets for subsequent division into bags.—746,906. *E. F. Hiscock.*

Bottle handling plant

In B.P. 747,138, a bottle-crating and de-crating device comprises a bottle-gripping and lifting head which is secured by a transfer arm to an independently vertically reciprocable member, itself connected to a further member for oscillation therewith about a vertical axis. In B.P. 747,140, a complete mechanised handling plant comprises a crate conveyor, a bottle de-crater and conveyor, a guide for transferring and distributing the de-crated bottles to an accumulator conveyor, a marshalling device for forming rows of bottles and feeding them to a washer, a conveyor for feeding washed bottles through a filling and capping unit, and a further marshalling device and a bottle-crating mcahine.—747,138 and 747,140. *Graham-Enoch Mfg. Co., Ltd., et al.*

Filleting fish

Two cuts are made, one on each side of the backbone but not through the back, followed by two successive further cuts to sever both the backbone and the back fin.—747,117. *R. G. T. Baader.*

Sausage-linking machine

A stuffed case is passed through a link-forming and twisting head and is delivered to the interior of a rotating container which forms the length of links into coils. The container is movable longitudinally to transfer such coils to a receiving device.—747,127. *L. P. Cross.*

Poultry killing device

An apparatus consists of a receptacle for a bird (*e.g.* a turkey) with its head and neck projecting, and a lever mechanism for engaging and dislocating the neck.—745,958. *G. Ward et al.*

Chocolate manufacture

Crude cocoa liquid is intimately mixed with gas (*e.g.* air) which entrains impurities, the mixture then being immediately dispersed into particles (*e.g.* centrifugally) to release the gas.—747,217. *H. L. Ricard.*

Treating raw poultry

Improvement in flavour of fowl flesh by injecting into the uncooked flesh at moderate temperatures, an aqueous liquid essentially comprising an edible gelling agent and mono alkali metal salt of glutamic acid in sufficient concentration to set semi-solid on cooling.—747,053. *International Minerals and Chemical Corp.*

Poultry, etc., plucking machine

A rotary plucking blade and a thumb unit, mounted for oscillation within the orbit of the blade, cyclically move into gripping, plucking and releasing zones. The thumb unit is urged resiliently so that an acceleration is imparted thereto in the plucking direction and just before gripping relationship is established, whereby the blade and thumb unit move at substantially the same velocity when gripping is effected.—747,355. *A. G. Budd.*

Fish meal production

A cooking and partial dehydration step, which produces a fibrous mass without visible excess moisture, is effected by conveying the fish in a closed cycle while agitating it.—747,363. *S. Hiller.*

Food preservation

Food substances having a rind, skin, shell, etc., covering are bombarded with penetrating ionising radiation, selected so that inactivation of decay-causing, organisms is limited to such covering.—745,962. *Electronized Chemicals Corp.*

Sausage-skinning machine

In B.P. 745,966, a skin-slitting means has an associated plough member which engages between the skin and the sausage, such plough having an internal passage in communication with a supply of pressure fluid. In B.P. 745,975, a power-operated skin-withdrawing mechanism adjacent the skin-slitting means is controlled by a device which is actuated by the contracted skin portion at the rear end of a sausage to cut off the power until such portion is distended.—745,966 and 745,975. *Kartridge-Pak Machine Co.*

Egg, etc., grading machine

A conveyor system incorporates a weighing mechanism and a device for recording the quality and weight of each article, discharging mechanisms being provided at pre-determined points along the conveyor for discharging an article at one such point in accordance with the data received by the recording device.—747,455. *Food Machinery and Chemical Corp.*

Beverage dispenser

A dispenser delivers beverage-filled drinking cups, the beverage being supplied from valve-controlled containers of pre-mixed beverage, one or more of which are pressurised.—747,538. *Pepsi-Cola Co.*

Dry coffee extracts

A solution of flavouring substances from roasted coffee in an organic non-fatty solvent which has a boiling point $< 100°C.$, is emulsified in an aqueous coffee extract, and the emulsion dried to form a solid product.—744,757. *Niro Atomizer.*

Rice polisher

A hopper-fed rotary polishing member has a pair of vertically spaced outer walls tapered upwardly and outwardly and connected by a shoulder, a co-acting bran-removing wall being parallel to the contour of such member.—744,792. *T. Satake.*

Treating coffee beans

Coffee beans are dried in a circular container having a perforated floor with an underneath air supply. Radial rotating arms each carry adjustable spreader paddles.—746,137. *J. M. Williams.*

Ice cream

A band or ribbon of ice cream is formed in a chilled condition on a moving conveyor, cut while on the conveyor into portions by a reciprocal cutter, and thereafter frozen while still on the conveyor.—742,644. *J. Lyons and Co., Ltd.*

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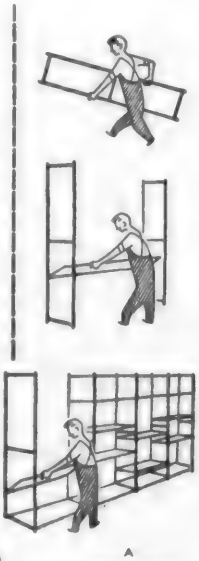

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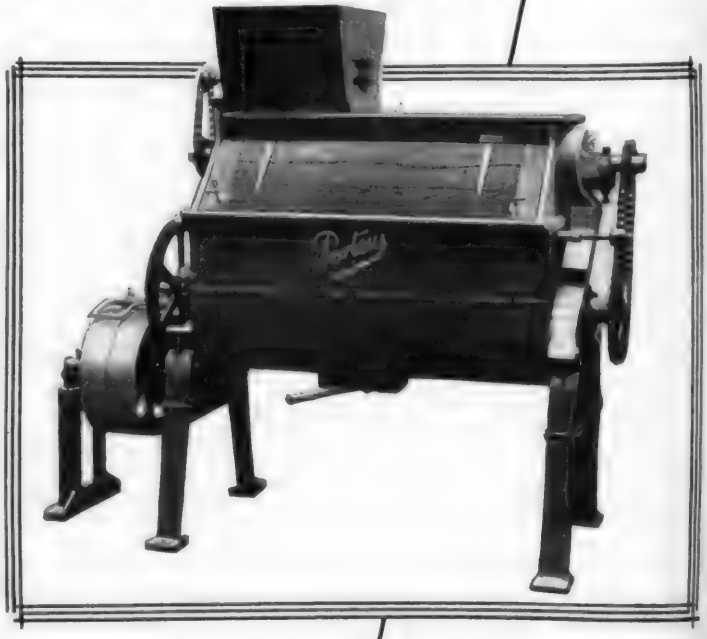

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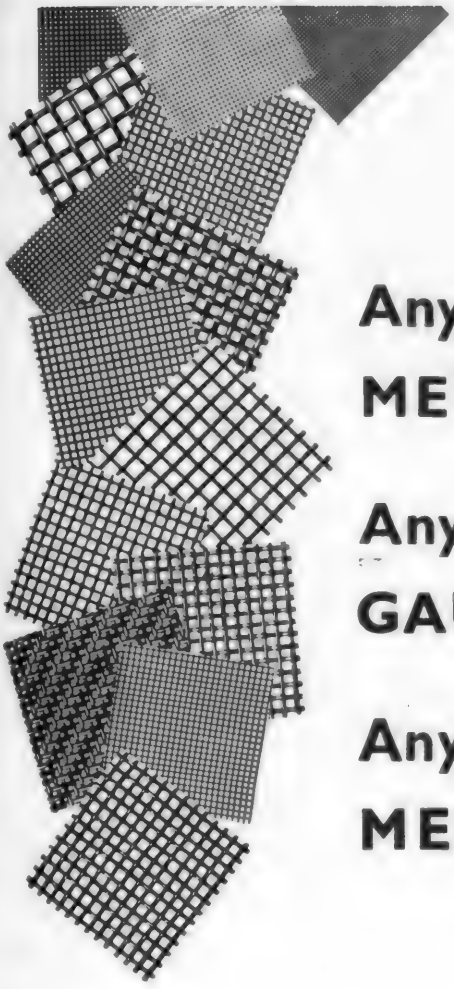

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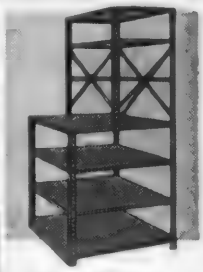

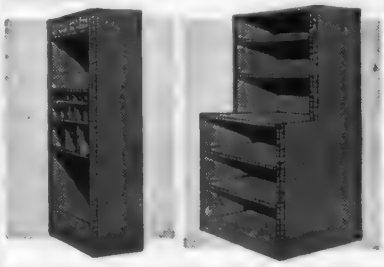

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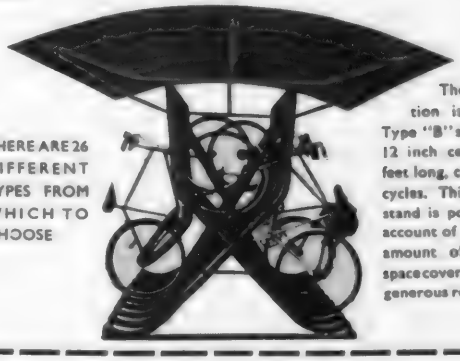

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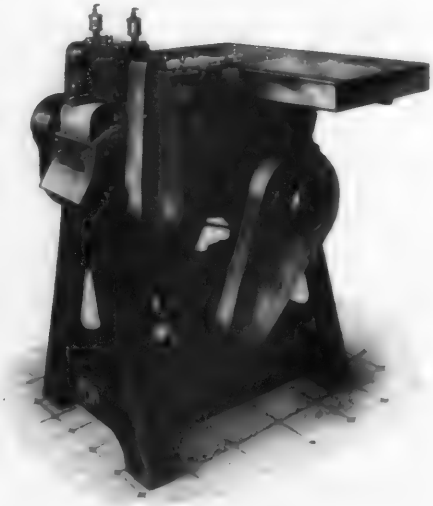

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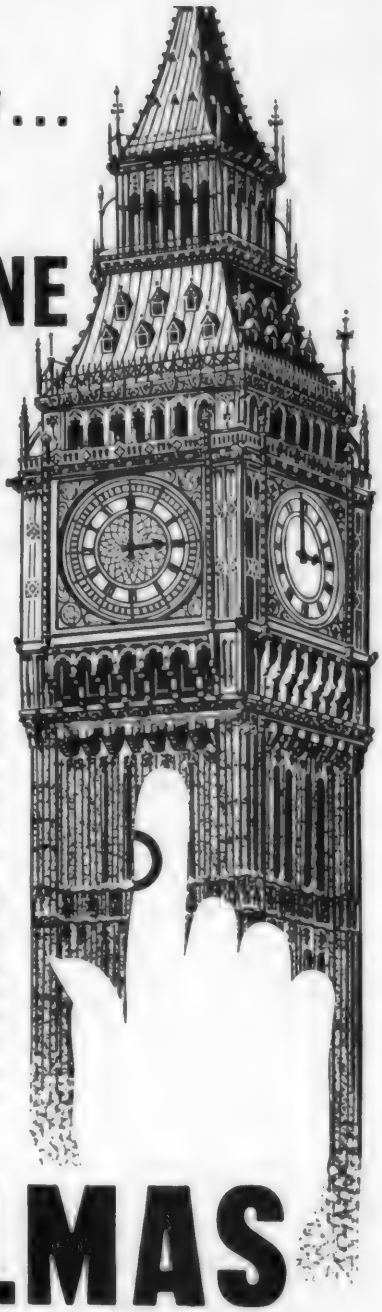

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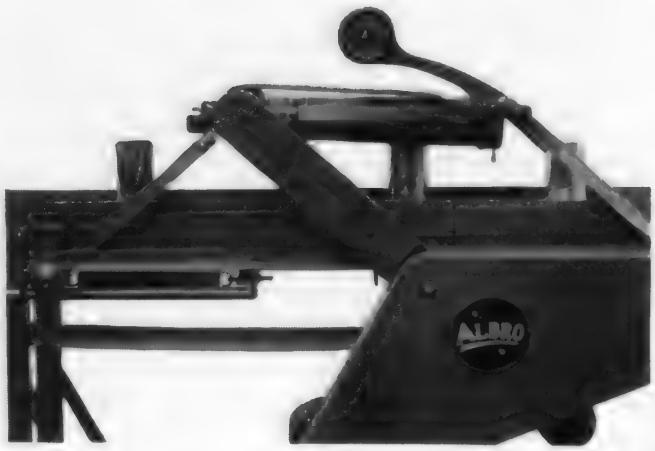

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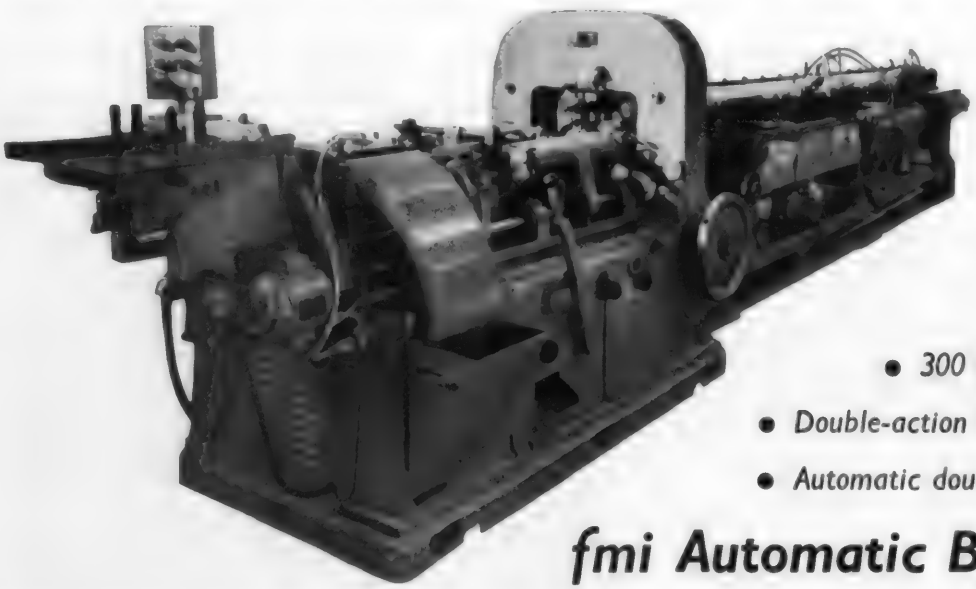

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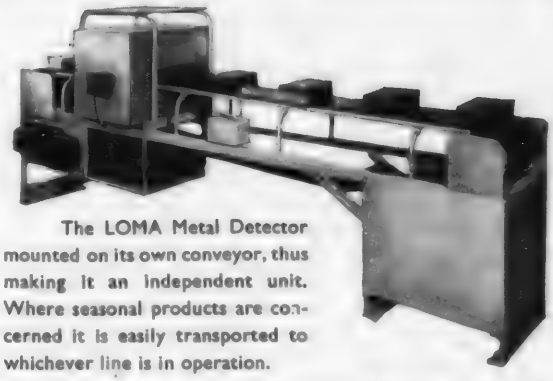

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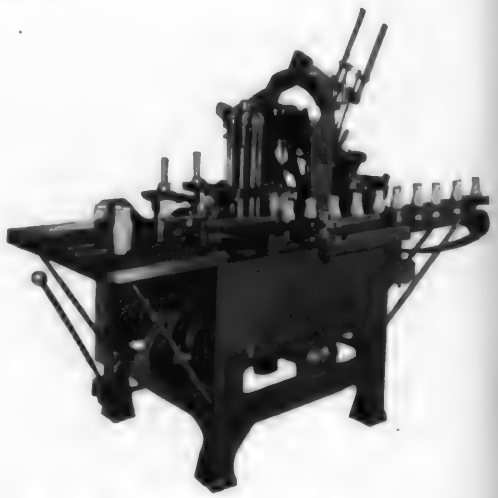

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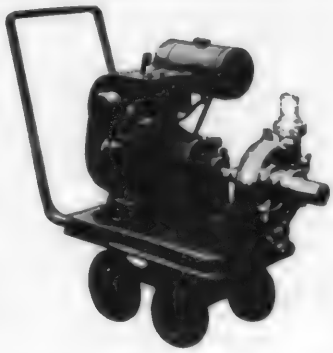

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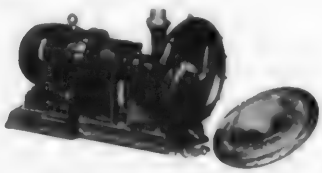

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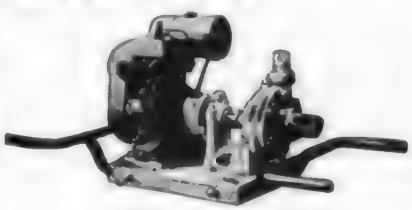

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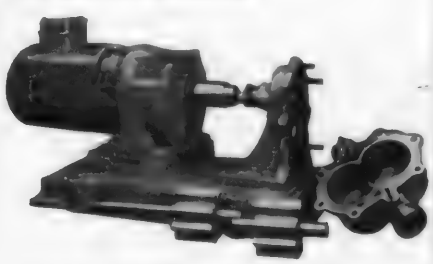

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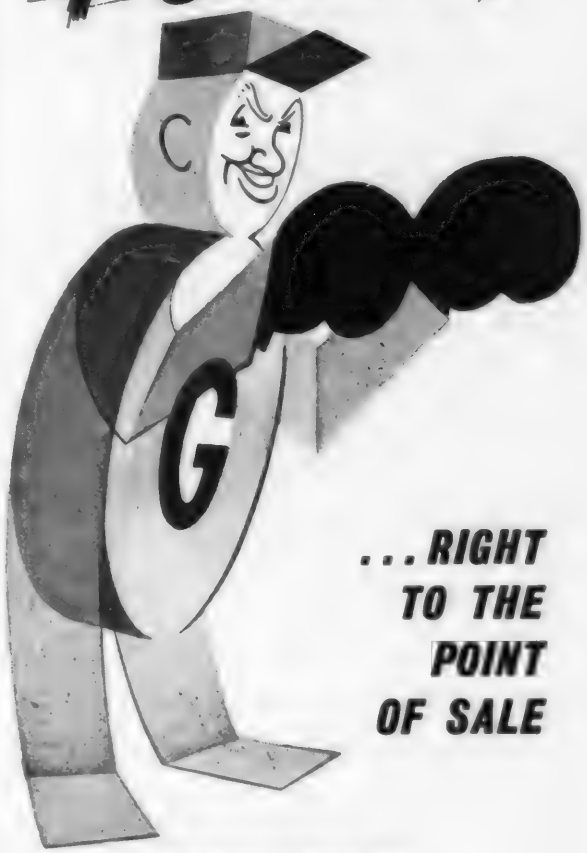

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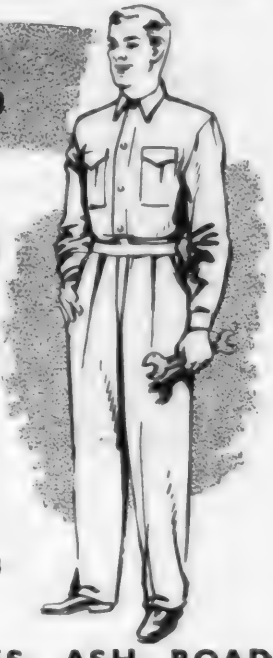

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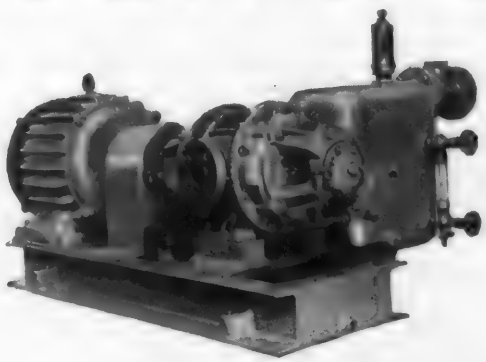

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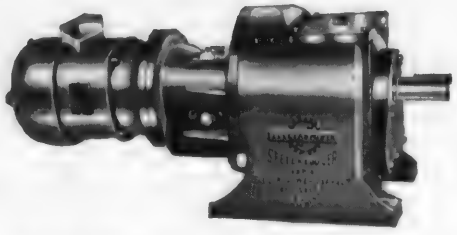

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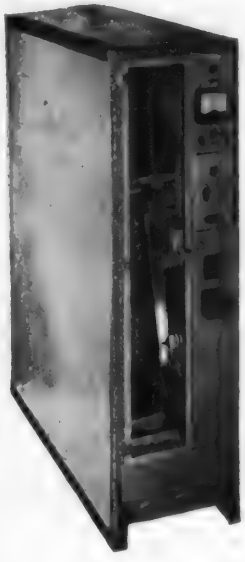

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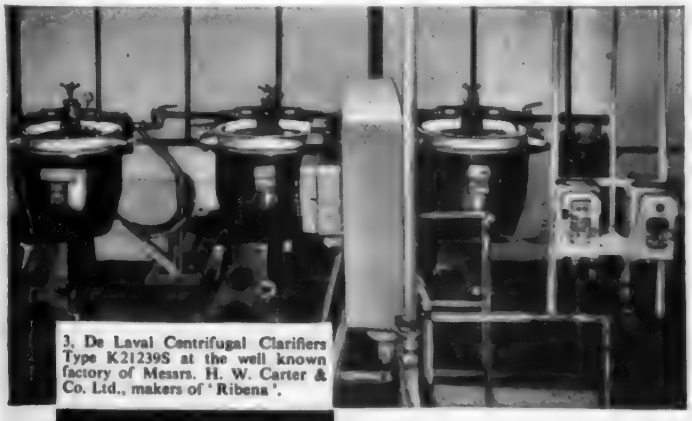

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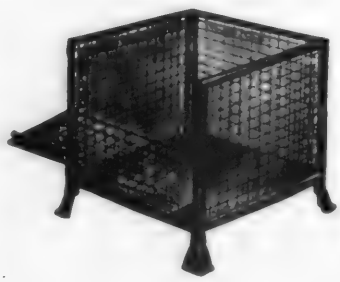

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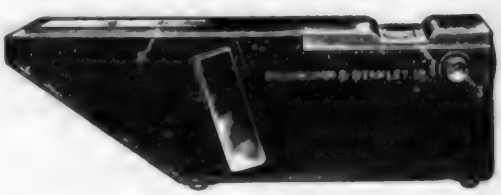
for jams, molasses, malt extracts, and other difficult substances.



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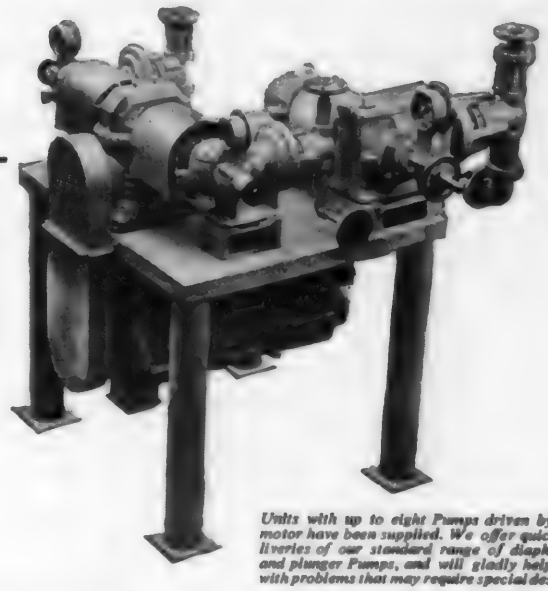
Drive is by variable-speed motor so that the rate of delivery of mixture can be controlled over a wide range whilst maintaining the blend.



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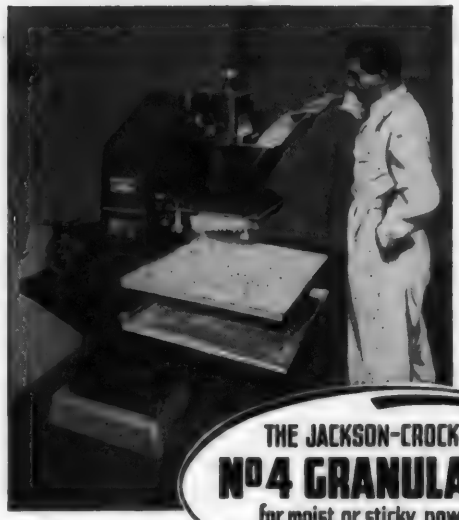

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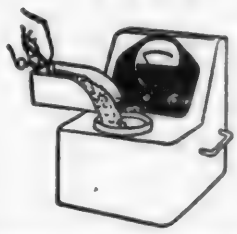		

It's as simple as ABC to check the amount of moisture in a scoop of barley, oatfeed, split peas, tea, malt, lentils or any other solid food. All you do is pour a scoopful into the Baldwin "NPL" Moisture Meter, read the dial and empty the pan. Meters can be supplied for either direct reading of any one food or with charts for measurement of many kinds. Ask for *LEAFLET B-105* which gives full details.

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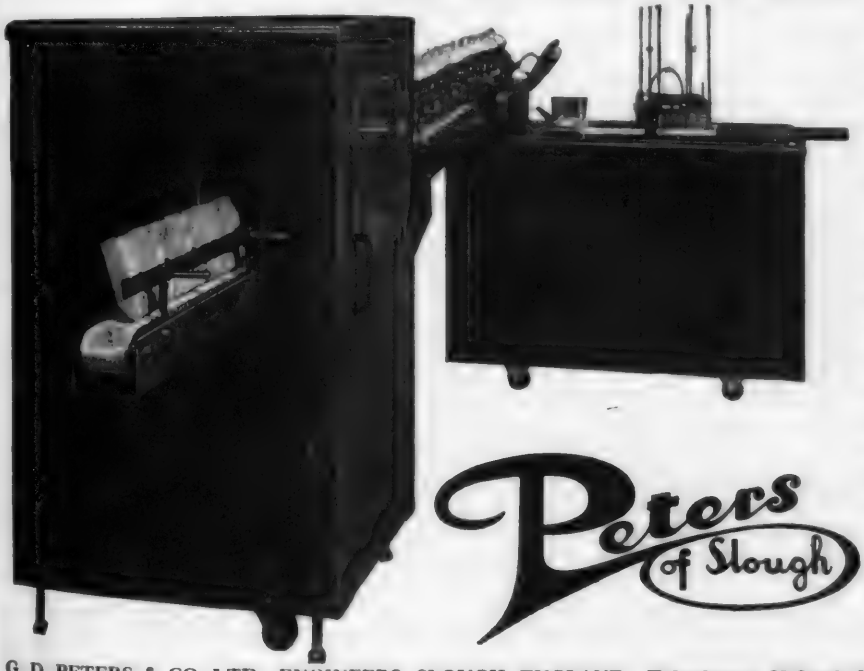

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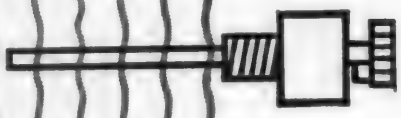

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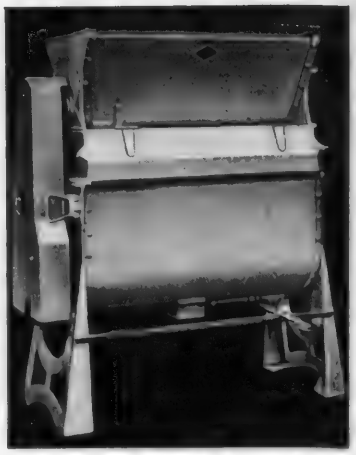

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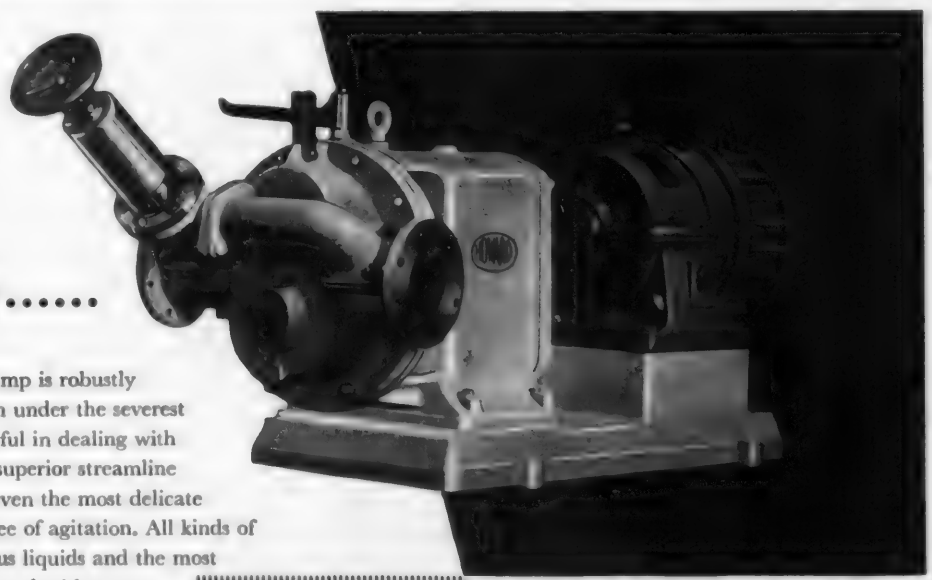

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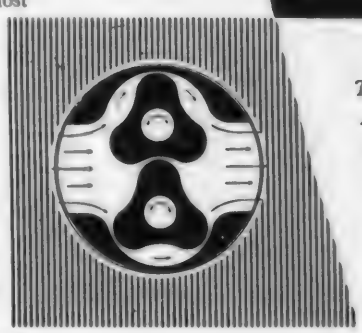

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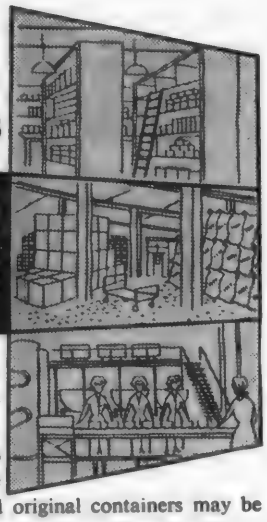

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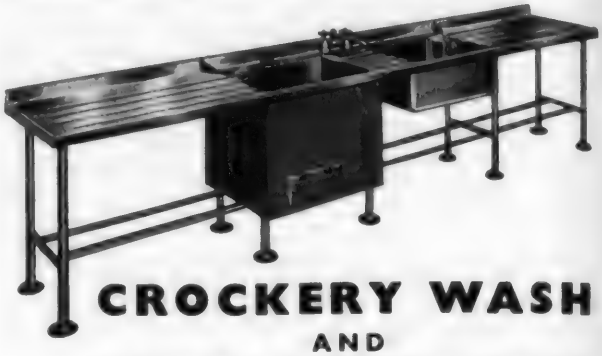

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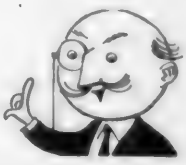

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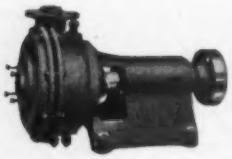

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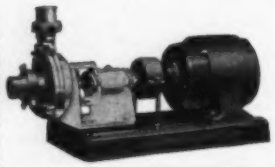

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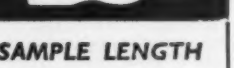

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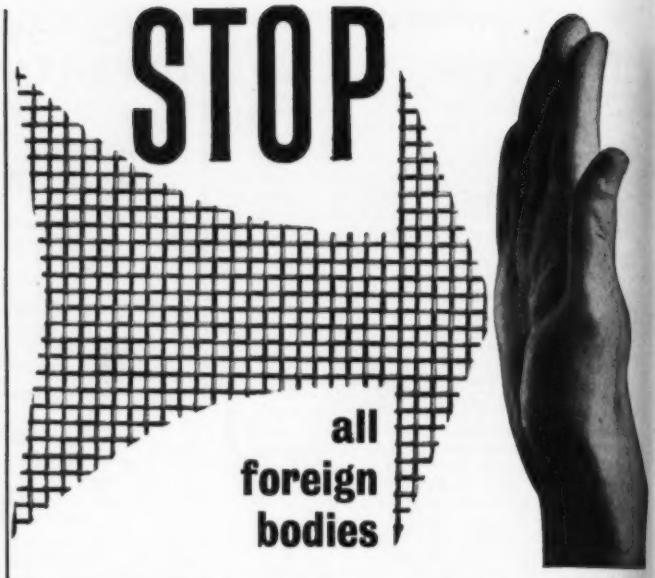

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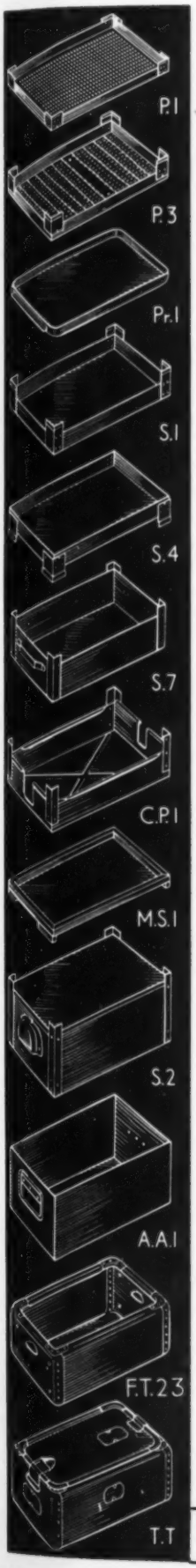

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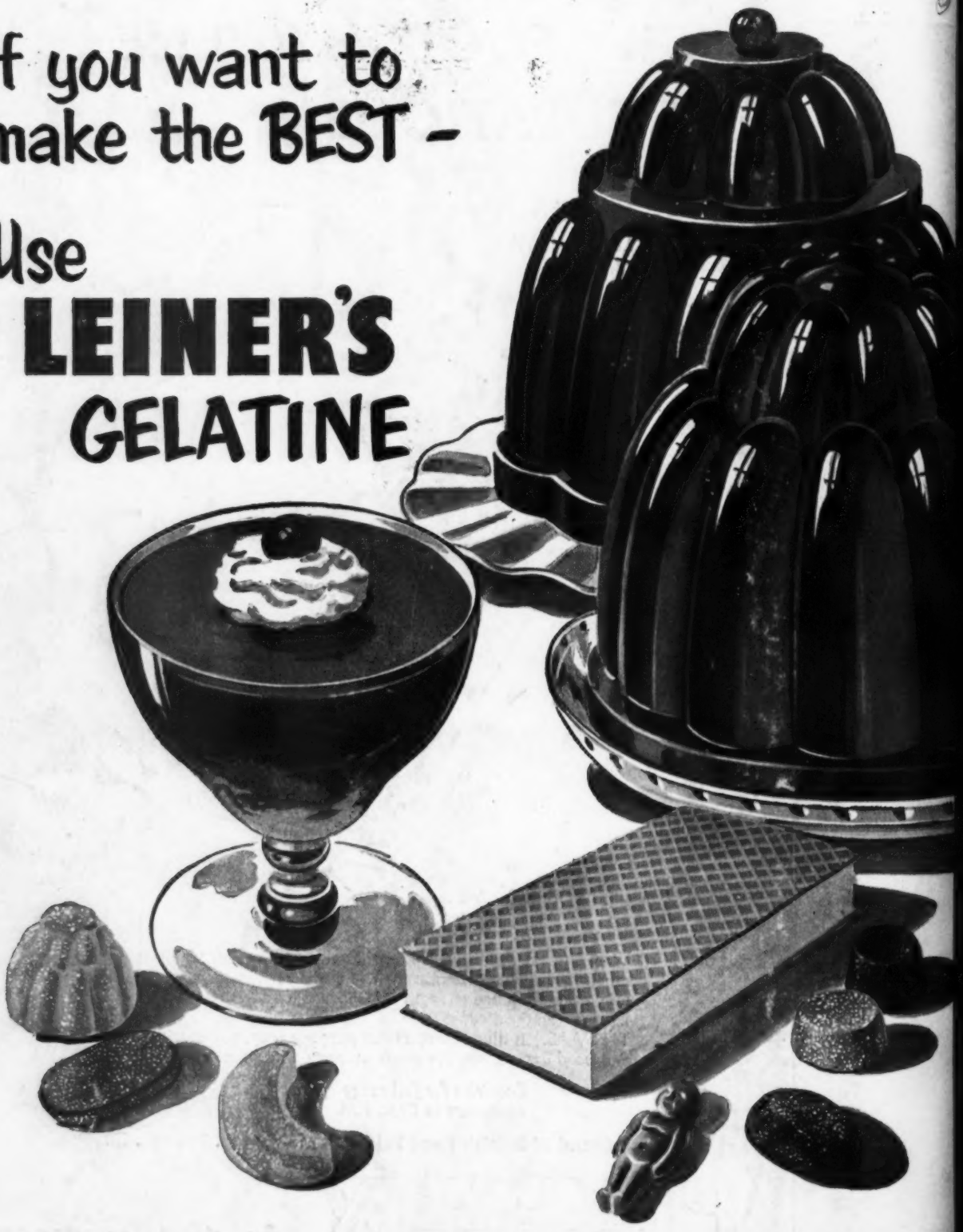

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